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Air Quality Impacts of Transit Improvement, Preferential Lane, and Carpool Programs: An Annotated Bibliography of Demonstration and Analytical Experience

Peat, Marwick, Mitchell and Co., Washington, D.C.

Prepared for

Environmental Protection Agency, Washington, D.C.

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Transit Improvement, Preferential Lane, and Carpool Programs

An Annotated Bibliography of Demonstration and Analytical Experience

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Transit Improvement, Preferential Lane, and Carpool Programs: an Annotated Bibliography of Demonstration and Analytical Experience

FINAL REPORT

prepared for
Environmental Protection Agency
Office of Transportation and Land Use Policy
in cooperation with
U.S. Department of Transportation
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16. ABSTRACT

This report has been prepared in accordance with Section 108(f) of the Clean Air Act, as amended, August 1977. It is intended to assist urban areas in developing State Implementation Plans and integrating their transportation system management and air quality planning programs as required by FHWA, UMTA, and EPA.

The report analyzes the air quality, travel, energy consumption, economic, and cost impacts of three types of transportation programs: priority treatment for high occupancy vehicles on freeways and arterials; areawide carpool and vanpool programs; and transit fare reductions and service improvements.

Important factors (e.g., meteorological conditions, traffic volumes and speeds and changes in modal choice) likely to influence air quality and emissions for the above programs are also analyzed.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air Pollution Abatement Carpooling Automobile Traffic Reduction Transportation Planning	Air quality Travel Impacts Reserved Lane Strategies Vanpooling/Carpooling	

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I. INTRODUCTION

OBJECTIVE

In accordance with the Clean Air Act Amendments of 1977,[1] the Environmental Protection Agency is evaluating the use and cost-effectiveness of alternative short-range transit fare and service improvement strategies, carpool and vanpool strategies, and strategies involving the preferential treatment of high occupancy vehicles to improve air quality in urban areas.[2] The evaluation of individual strategies and combinations of the above strategies includes their emission and air quality impacts and their related energy, noise, and economic impacts. A comprehensive literature review was also conducted, as part of this evaluation, to identify both observed and projected travel, emission, air quality, energy, noise, and economic impacts of the short-range low-cost strategies of interest.

This document presents an annotated bibliography of useful reports, papers, and other references describing the above impacts for the transit, carpool, vanpool, and preferential treatment strategies of interest. The bibliography should be useful to elected officials, government administrators and their technical staffs, and citizens involved in the development of Transportation Control Plans, Transportation System Management Elements and related short-range planning activities.

DEVELOPMENT AND ORGANIZATION

Abstracts within this bibliography are organized under five subject areas. Each area is described briefly below:

- General. Reports broadly addressing transportation system management, short-term transportation planning techniques, conference proceedings, and sources which treat several of the strategies addressed in the project.

- Preferential Treatment of High Occupancy Vehicles (HOV). Descriptive, simulation, and case study material on reserved lanes, priority ramp facilities, and traffic signal preemption for buses, carpools, and vanpools on urban freeways and arterial facilities.

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[1] 42 USC 7401

[2] This evaluation is being performed in the EPA study, "Air Pollution Reduction Through Transit Improvement Program" (Control No. 68-01-3912).

- Carpool and Vanpool Programs. Descriptive, case study, and simulation analyses on area-wide and employer-based carpool and/or vanpool programs.

- Transit Fare and Service Strategies. Studies addressing the impacts of transit fare reductions or restructuring, and of transit service improvements on transit ridership and system performance.

- Energy, Air Quality, Emissions, and Economic Impacts. Studies addressing the potential positive and negative impacts of various transportation-related actions on energy consumption, air quality, emissions, and the economy of urban areas.

Abstracts included in this bibliography were selectively compiled from the three recently published annotated bibliographies listed below:

- JHK and Associates, A Selected Bibliography and Reference Document in Urban Public Transportation, (Prepared for Federal Highway Administration and Urban Mass Transportation Administration), July 1976;

- JHK and Associates, A Selected Bibliography and Reference Document in Transportation System Management, (Prepared for Federal Highway Administration), May 1977; and

- Oram, Richard L., Transportation System Management, A Bibliography of Technical Reports, (Prepared for Urban Mass Transportation Administration and Federal Highway Administration), May 1976.

In addition to these sources, abstracts prepared by the author(s) and/or editor(s) of individual documents were used where applicable. Finally, sources used in this study but not annotated in one of the above sources were annotated by project staff. The sources of the abstracts are identified in parentheses at the end of each abstract. While an effort has been made to cite each reference in a uniform manner, certain differences do occur since this bibliography has been compiled from several different sources.

II. GENERAL

Alan M. Voorhees & Associates, Inc., Short-Range Transit Planning, McLean, Virginia, July 1973.

Abstract

This report is a reference document for those communities contemplating the preparation of short-range transit development programs. The basic objectives of these programs are the revitalization of public transportation and the provision of greater mobility for substantial groups of transit-dependent persons.

The report is structured to allow those responsible for local decisions to be better informed on the transit options available to their community. It should be of particular interest to local elected officials, regional planning agencies, and transit operators.

One constraint worthy of note is that the material in this report was designed for communities having less than 1 million residents. The material is not designed for areas with more than 1 million residents because of the increased complexities of transportation/general planning relationships in these areas.

In the development of this report, seven monographs on selected phases of transit planning were prepared. These monographs are not meant to advance the state-of-the-art by presenting new, untried methods or procedures. Nor do the monographs recommend or advocate the use of specific techniques over others. They do, however, present techniques that have been used successfully in selected urban areas across the country. The monographs are for the following functional areas: routes and schedules; fare structure and pricing; fleet mix; marketing; management; financial planning; and citizen involvement.

(Oram)

Alan M. Voorhees & Associates, Inc., Transportation Pooling, (Prepared for Urban Mass Transportation Administration), January 1974.

Abstract

With the advent of impending energy shortages in the winter of 1973-74, the U.S. Department of Transportation embarked on an accelerated program to promote increased use of high-occupancy vehicles--transit and carpools. As part of this program, a series of reports was prepared that summarized the major aspects of carpool programs designed to assist local areas in initiating successful pooling action programs. This report is a collection of the 10 individual reports. The goal of the Carpool/Buspool Program is to satisfy travel requirements more efficiently by increasing passenger occupancy in autos and buses, thereby reducing the number of vehicles using the streets and highways. Achievement of that goal calls for coordination among many institutions within a metropolitan region, including public agencies and citizen and business groups. The information and techniques presented in this report should be considered as a guide to the development of a sound program in a metropolitan area. The individual reports contained in this volume are: Review of Carpool Activities, Organization for Carpooling, Approaches to Matching, Legal and Institutional Issues, Incentives to Carpooling, Transit/Taxi Coordination, Vanpools, Buspools, Pooling for the Disadvantaged, and Carpool Backup Systems.

(Oram)

American Institute of Planners, Frontiers in Transportation Planning - Papers for the 57th Annual Conference of the AIP at Denver, Colorado, October 1975, Transportation Planning Department, AIP, Washington, D.C., 1975.

Abstract

This series of papers from the recent AIP conference reflects two aspects of transportation planning: timeliness and uniqueness. They range from Martin Wohl's overview of where we're going with the automobile, through what the planning schools are teaching, to a consideration of using BART as a recreational device.

(JHK and Associates)

Benjamin, P., et al., Service and Methods Demonstration Program: Annual Report, UMTA, Washington, D.C., November 1975, (April 1976).

Abstract

This report contains a description of the Service and Methods Demonstration Program. Transit demonstration projects undertaken in previous years are reviewed. Recently completed and current demonstration projects are described, and project results from similar demonstrations are compared. The comparisons are made by grouping projects according to the program objectives addressed: (1) decrease transit travel time, (2) increase transit reliability, (3) increase transit coverage, (4) increase transit vehicle productivity, and (5) improve the mobility of transit dependents. Demonstrations are categorized as either experimental, i.e., those intended to develop and test concepts to the point where they merit widespread use, or exemplary, i.e., those conducted to achieve more widespread diffusion of proven concepts and techniques.

Independent activities carried out in support of the demonstrations are described, such as the development of evaluation guidelines and improved methodologies for demonstration evaluation, analytical studies in support of the development of experimental demonstrations, and case studies of independent local innovations. Information dissemination mechanisms and activities intended to facilitate more widespread knowledge of effective approaches to improving transit are discussed.

The Appendix contains a detailed description of each demonstration project including the objectives, history, status, results, evaluation, and conclusions.

(authors)

Connecticut Department of Transportation, Status Report: Three Point Program to Reduce Fuel Consumption, Traffic Congestion, and Air Pollution, July 1975.

Abstract

This report presents information concerning the Three Point Program to Reduce Fuel Consumption, Traffic Congestion, and Air Pollution. The three points of the program are as follows:

1. Foster carpooling and charter express bus service (bus pooling) in private industry through the use of the Department's computer consultation services.

2. Construct additional interchange parking facilities to facilitate carpooling.

3. Develop additional express commuter bus service between suburban areas and the central business districts of Connecticut cities.

This report is subdivided into several sections so that the background, previous status, activities, and accomplishments in fiscal years 1974 and 1975, and present status could be presented in a clear and informative manner.

(authors)

Deleuw, Cather & Co. and the Urban Institute, Characteristics of Urban Transportation Systems: A Handbook for Transportation Planners, (Prepared for Urban Mass Transportation Administration), May 1975.

Abstract

The objective of the handbook, specifically for use by transportation planners in the evaluation of alternative systems, is to provide a single simplified reference source which characterizes the most important (from the standpoint of evaluation) performance characteristics of the following contemporary urban transportation systems: (1) rail (commuter, rapid, and light) (2) local bus and bus rapid transit; (3) automobile-highway system (automobiles and other vehicles); (4) pedestrian assistance systems; and (5) activity center systems--people mover systems that have been installed at airports, zoos, amusement parks, etc. The handbook assesses the supply or performance aspect of urban transportation dealing with passenger demand implicitly. Seven supply parameters studied are: speed, capacity (service volume), operating cost (vehicle), energy consumption (vehicle or source), pollution, capital cost, and accident frequency. This document is primarily a reference manual.

(Oram)

DiRenzo, John, and Ellis, Raymond, Peat, Marwick, Mitchell & Co., An Assessment of Immediate Action Travel Reduction Strategies for Achieving Air Quality and Energy Conservation Objectives, (Paper presented at the 1975 Intersociety Conference on Transportation, Atlanta, Georgia), July 1975.

Abstract

The impacts of the five plans are evaluated in a detailed case study of a representative automobile oriented metropolitan area--San Diego, California. The travel impacts examined include changes in person travel demand, automobile occupancy, vehicle miles of travel (VMT), transit usage, travel cost, and travel time.

This paper is organized into four major parts: the first defines the five alternative immediate action strategies analyzed in the study; the second presents selected aspects of the methodology used to estimate the travel behavior and transportation system impacts of the alternative Transportation Control Plans (TCPs); the third presents the results of the impact analysis; and the fourth evaluates and summarizes the study findings.

(author)

Dupree, John H., and Pratt, Richard H., Low Cost Urban Transportation Alternatives, (3 Volumes), R. H. Pratt Associates, Inc., (Prepared for U.S. Department of Transportation), Kensington, Maryland, January 1973.

Abstract

This report details the results of case study investigations and analyses of seven operating exclusive bus lanes. Three of the exclusive bus lanes operate as contraflow facilities on freeways, three as contraflow bus lanes on arterial streets, and one as a specially constructed bus lane.

The study found that exclusive bus lanes were capable of processing large volumes of passengers, often with substantial time savings over competing modes. Findings indicate that busways offer the potential for substantial gain in total capacity to move people. There is strong evidence that commuters are attracted to public transportation such as can be provided via an exclusive bus lane if travel time saving is achieved. Bus lanes can be made operable in a matter of weeks at a cost that can often be absorbed within operating budgets.

A variety of technical, institutional, and operating experiences associated with the various bus lanes now operational are detailed. In addition, the potential for bus lanes in five diverse urban environments is analyzed. Data are provided on federal funding appropriate to establishing bus lanes.

(Oram)

Federal Highway Administration (FHWA), Research and Development Program 1975, (Annual Report), FHWA, Washington, D.C., 1975.

Abstract

This annual report of the Federally Coordinated Program of Research and Development briefly describes the programs established by the FHWA

Offices of Research and Development to provide technology leader3hip to the highway research community. It presents the administrative machinery which coordinates widely scattered research activities funded by the federal taxpayer and explains how the Federally Coordinated Program functions to ensure that adequate effort will be applied to solve the more urgent highway-related problems, while incorporating the latest life-saving techniques, achieving maximum operating efficiency, reducing environmental impacts, and holding construction and maintenance costs to the minimum possible in the nation's highway system.

(author)

Goodman, C. R., Rosapep, T. J., Bert, M. D., and Mordecai, J. M., Short-Term Implications of Selected Transportation Policy Alternatives (Prepared for the Baltimore Regional Planning Council and Maryland Department of Transportation), May 1977.

Abstract

This report is intended to determine the effectiveness of various alternatives aimed at reducing traffic demand, fuel consumption, and auto emissions. Seven alternatives were explored independently of other alternatives. Alternatives evaluated include:

- a trend case (which assumes a continuation of past growth patterns and planned transportation system implementation);
- area-wide carpooling;
- area-wide vanpooling;
- bus operation improvements;
- parking charges; and
- rapid transit system.

The impacts of each strategy are compared to a base case of 1975, with respect to the following regional objectives:

- increase transit ridership;
- provide adequate service for transit dependents;

- reduce auto emissions;
- reduce fuel consumption; and
- reduce highway congestion.

(PMM&Co.)

Hemphill, John G., and Difiglio, Carmen, Transportation Management and Energy Conservation, (Presented at the Fourth Intersociety Conference on Transportation), July 23, 1976.

Abstract

The purpose of this paper is to explore the energy conservation impacts of various transportation management policies such as those found in the Transportation System Management elements of the joint Urban Mass Transportation Administration (UMTA) and Federal Highway Administration (FHWA) Transportation Improvement Programs, in the Environmental Protection Agency's (EPA) Transportation Control Plans, and in the Federal Energy Administration (FEA) State Energy Conservation Program.

The policies found in all three of these federal programs are aimed at influencing an individual's decision on whether to travel and by what mode so as to result in, among other things, less energy being used in urban transportation. Energy savings are realized when:

- total miles of travel are reduced (e.g., travel is foregone, shorter trips are substituted for longer ones, or trips are consolidated); and/or
- more energy-efficient modes of travel are used in lieu of less efficient ones.

(author)

Horowitz, Joel, and Kuhrtz, Steven, Transportation Controls to Reduce Automobile Use and Improve Air Quality in Cities, Office of Air and Waste Management, EPA, Washington, D.C., November 1974.

Abstract

This report was prepared pursuant to the Energy Supply Environmental Coordination Act of 1974, which mandated that EPA conduct a study on the

necessity of parking surcharge, management of parking supply, and preferential bus/carpool lane regulations as part of implementation plans to achieve and maintain air quality standards. The report addresses the need for transportation controls and automobile use reductions, discusses alternative methods of reducing automobile use (parking management, transit improvements including preferential treatment, carpooling, transportation pricing, bicycling, etc.) and the effectiveness of each, the background, development process, and current status of Transportation Control Regulations, the economic and social effects of reductions in auto use, and the relationship of transportation controls to other aspects of transportation planning and decision-making.

(Oram)

Institute for Defense Analyses, Economic Characteristics of the Urban Public Transportation Industry, DOT, Office of Systems Analysis and Information, Washington, D C., February 1972.

Abstract

This report analyzes and interprets economic information on the operations of bus transit, rail rapid transit, commuter rail transit, and taxicab firms. Basic data in the report came from secondary sources and represent annual aggregates, not daily operational data. The analyses are rather general and are oriented towards the bus transit industry because of the greater availability of data for that mode.

(Oram)

INTERPLAN Corporation, Integration of Transit Systems, (Prepared for the Urban Mass Transportation Administration).

Abstract

The objective of this four-volume report is to assess the potential for interagency and intermodal integration of transit systems in U. S. urban areas, drawing on an analysis of the successful experience of European transit systems.

Volume I - Concepts, Status, and Criteria (May 1973) documents the need for transit integration in U. S. urban areas, presents the conceptual and evaluative framework, and reviews current transit integration efforts by federal, state, and local governments.

Volume II - Integrated European Transit Systems (May 1973) describes in detail four major European transit systems (London, Hamburg, Paris, Munich), gives brief descriptions of six others, and summarizes and appraises the applicability of European successes to U.S. systems.

Volume III - Transit Integration in U.S. Urban Areas (June 1973) provides application of techniques to Philadelphia, San Francisco, and Seattle, as well as to an archetypal smaller urban area, and gives a brief assessment of potential for application to six other U.S. cities.

Summary (October 1973) serves as a guide to the location of detailed factual information upon which conclusions found in this volume are based. Salient points of each volume are brought together, including definitions of the forms which integration may take, evaluation of U.S. deficiencies, an approach to identifying systems ready for integration, and estimates of costs of U.S. expansion and improvement.

(Oram)

JHK & Associates, Working Paper #1, Review of Selected Traffic Management Schemes, (Prepared for Federal Highway Administration), June 1977.

Abstract

The purpose of this working paper is to review and describe selected traffic management schemes with respect to:

- objectives of the scheme;
- strategies and combinations of strategies implemented;
- evaluation procedures and measures of effectiveness (MOEs) employed; and
- results of the scheme including, where possible, quantitative statements of its effectiveness in improving network traffic performance, its associated direct and indirect impacts, and the reasons for its success or failure.

This material is to serve as resource material for the development of future measures of effectiveness and TSM objectives. It describes the actual MOEs and objectives which have been used in a broad range of TSM strategies in the United States and abroad. Having been used in actual TSM studies, the objectives and MOEs presented herein will provide a good "practicality check" on objectives and MOEs.

(author)

Jones, David W., et al., Managing the Future Evolution of the Urban Transportation System: Interim Summary Report, ITS, Berkeley, California, October 1976.

Abstract

This report documents the findings of year one of a two-year research effort concerned with the impact and effectiveness of selective Transportation System Management (TSM) measures and their susceptibility to implementation given political and institutional constraints. The research effort involves methodology development and case studies in five task areas:

- traffic management measures such as ramp metering, preferential entry, reserved lanes, and signalization improvements on both surface streets and freeways;
- pricing rules to govern the implementation of congestion tolls or pollution charges;
- better neighborhood transportation;
- employer initiatives in transportation, such as vanpooling, carpooling, and work-hour scheduling; and
- the institutional and political dimension of TSM planning--barriers to implementation and strategies for coordination.

The report also includes a macroscopic analysis of TSM measures using a sketch planning model and a qualitative analysis of TSM's efficacy as an alternative to "built" solutions and non-transportation alternatives.

(authors)

Kendall, Donald et al., Service and Methods Demonstration Program Annual Report, (Prepared for the U.S. Department of Transportation System Center), April 1977.

Abstract

This report contains a description of the Service and Methods Demonstration Program. Recently completed and current and future demonstration projects are described, and project results from similar demonstrations are compared. The comparisons are made by grouping projects according to the program objectives addressed: (1) decrease transit travel time; (2) increase transit reliability; (3) increase transit coverage; (4) increase transit vehicle productivity; and (5) improve the mobility of transit dependents.

Independent activities carried out in support of the demonstrations are described, such as the development of evaluation guidelines and improved methodologies for demonstration evaluation, analytical studies in support of the development of experimental demonstrations, studies of independent local innovations, and case studies of transit operations in small communities. Information dissemination mechanisms and activities intended to facilitate more widespread knowledge of effective approaches to improving transit are discussed.

(author)

Keyani, Barbara Ibarra, and Putnam, Evelyn S., Transportation System Management: State of the Art, (Prepared for the Office of Policy and Program Development, Urban Mass Transportation Administration), September 1976.

Abstract

This report summarizes current information concerning the spectrum of actions that are relevant to Transportation System Management (TSM). Under Department of Transportation regulations, urban areas with population greater than 50,000 are required to develop TSM plans that document their strategy for improving air quality, conserving energy, and increasing transportation efficiency and mobility through coordinated operation and management of existing urban transportation facilities and services. TSM therefore includes actions to influence transportation demand as well as actions to manage the supply of service or its performance characteristics.

The report presents state-of-the-art information on 31 specific TSM actions within the following seven major categories: improving vehicular flow, preferential treatment of high-occupancy vehicles, reducing peak-period travel, parking management, promoting non-auto or high-occupancy auto use, transit and paratransit service improvements, and transit management efficiency measures.

Each summary includes examples of successful experience, advantages and disadvantages, guideline conditions concerning implementation, the range of costs involved, and interrelationships with the other actions.

(authors)

Kirby, Ronald F., et al., Para-Transit: Neglected Options for Urban Mobility, The Urban Institute, Washington, D.C., 1974.

Abstract

This report covers all forms of (1) hail or phone service, such as taxis, jitneys, and dial-a-ride; (2) pre-arranged ride sharing, such as carpools, vanpools, and subscription buses; and (3) hire and drive services, such as regular rental cars and other experimental forms. Such para-transit forms promise tremendous savings and greater flexibility than existing public transportation. The authors conclude with recommendations for overcoming the obstacles to worthwhile applications of para-transit in urban areas.

(Fletcher)

Kirby, Ronald F., Para-Transit: A Summary Assessment of Experience and Potential, The Urban Institute, Washington, D.C., June 1974.

Abstract

This study was designed to review experience to date with para-transit services, to assess their potential for serving urban transportation demand, and to design a research, development, and demonstration (RD&D) program as needed to identify and demonstrate innovations in the provisions of para-transit services which would be beneficial to U.S. cities. The para-transit services studied were grouped into three categories: a "hire and drive" category comprising daily car rentals and the various forms of short-term car rentals that have been proposed (including the Minicar and Public Automobile Systems); a "hail or phone" category comprising taxi, dial-a-ride, jitney, and related services; and a "pre-arranged ride-sharing" category comprising the various forms of carpool, vanpool, and subscription bus services.

(author)

Larwin, Thomas F., and Stuart, Darwin G., "Transportation Management Strategies: Prospects for Small Cities," TRR-603, TRB, Washington, D.C., 1976.

Abstract

A case study transportation management program for the Santa Barbara, California, CBD is reviewed. (The population of Santa Barbara is approximately 75,000; the population of the urbanized area is approximately 130,000.) The purpose is to indicate the breadth and scope which similar programs might take in other smaller urban areas. Three alternative scenarios for transportation management are outlined: (1) maximizing non-auto access, (2) minimizing auto access, and (3) maximizing internal circulation opportunities. The evaluation of more specific options within these categories, according to both potential levels of goal-achievement and local community preferences, is described. The recommended transportation management program is then outlined. Conclusions are drawn regarding the applicability of case study concepts and methods to other areas.

(Oram)

Manheim, Marvin L., et al., "Transportation Decision-Making: A Guide to Social and Environmental Considerations," NCHRP R-156, Massachusetts Institute of Technology, Cambridge, Massachusetts, and TRB, Washington, D.C., 1975.

Abstract

This report will be of particular interest to transportation administrators, engineers, and planners in all disciplines involved in transportation decision-making, as well as a variety of community groups. It presents an integrated approach for systematically incorporating social, economic, and environmental factors into transportation planning and decision-making. Professionals participating in system and project development will find parts of the report tailored to their needs. Transportation administrators will find sections of the report cover a number of policy and institutional implications associated with implementation of the procedural recommendations. Those involved in both project studies and agency management will find the overview of the proposed approach to be helpful in considering (a) the coordination of federal, state, regional, and local institutions; (b) the issues of equity; (c) the amelioration of negative impacts; (d) the easing of mobility problems for the transportation disadvantaged; and (e) the determination of costs that include social and environmental costs.

(authors)

Meyer, Michael, et al., "A Review of Transportation System Management Plans Submitted in Response to New Federal Policy," Center for Transportation Studies (CTS) Working Paper 76-3, MIT, Cambridge, Massachusetts, October 1976.

Abstract

One year ago, the Urban Mass Transportation Administration (UMTA) and the Federal Highway Administration (FHWA) issued regulations that required a transportation plan for a metropolitan region to consist of two components: a transportation systems management (TSM) element and a long-range element. For the first time, the metropolitan planning organization (MPO)--an organization responsible for developing the transportation plan--had to include an element in this plan which directly addressed the short-range transportation needs of the urbanized area and which identified those options that provided for the more efficient use of existing transportation resources. The Center for Transportation Studies at the Massachusetts Institute of Technology (MIT) has undertaken an initial review of the short-range (TSM) plans that have been submitted to the Federal Government in response to the new regulations. The purpose of this paper is to present the findings of this review and describe the current state-of-the-art of TSM planning as it has been shown in the documents submitted by 40 MPOs throughout the country.

(authors)

Moore, Marjorie M., editor, "Better Use of Existing Transportation Facilities," TRB SR-153, TRB, Washington, D.C., 1975.

Abstract

This Special Report contains papers presented at the Seventh Summer Meeting of the Transportation Research Board held in Jacksonville, Florida, August 5-7, 1974. The objective was to present timely and useful information on the theme of the meeting: Better Use of Existing Transportation Facilities. This theme was selected because of the need for increased transportation capacity in the face of growing resistance to new construction.

The Task Force responsible for the meeting program decided that, before the meeting turned to solutions applicable to specific areas and elements, those in attendance should be reminded that a metropolitan area is a transportation unit.

The report is divided into eight sections as listed here: (1) papers concerned with the entire metropolitan area; (2) capacity and service levels of urban freeways and intersections; (3) priority lanes for HOV; (4) intersection capacity determination; (5) lane closure with the least disruption; (6) detection and management of traffic incidents; (7) alternatives for better use of facilities including measures such as trip demand, staggered work hours, and trip price; and (8) highway safety improvements.

(JHK and Associates)

Organization for Economic Cooperation and Development, "Better Towns with Less Traffic," Proceedings of the O.E.C.D. Conference at Paris, 14-16 April 1975, Paris, 1975.

Abstract

This report contains the proceedings of an international conference at O.E.C.D. Headquarters in Paris. The aim of the Conference was to evaluate the possibilities and effects of policies for limiting motor traffic in urban areas, such as are being applied by a growing number of towns in member countries.

These proceedings contain the seven case studies discussed at the Conference, dealing with towns where overall policies are being pursued to limit motor traffic and improve the environment (Uppsala, Bologna, Singapore, Nagoya, Munich, Besancon, Nottingham).

The proceedings also contain summaries of the seven specialized sessions arranged during the Conference to deal with the main problems of urban transport (parking; traffic limitation; cyclists and pedestrians; priorities for public transport; para-transit; planning, financing, and implementing the policies for urban transport; and the economic and energy implications of these policies).

The findings of the Conference on "Better Towns with Less Traffic" are based on practical experience in a number of large towns. In submitting them in this report the O.E.C.D. hopes to offer some ideas to all the local, national, or international authorities concerned with town planning and traffic problems.

(Oram)

Organization for Economic Cooperation and Development, Improvements and Innovations in Urban Bus Systems: Proceedings of the Annual Technology Assessment Reviews, Davis, 1969.

Abstract

This international collection of reports, though dated, is still valuable in the areas of bus priority, flexibility, design, and control. It indicates the widest concern over these problems from the broadest spectrum of opinion.

(JHK and Associates)

Peat, Marwick, Mitchell & Co., Fringe Parking and Intermodal Passenger Transportation: Operational Experience in Five Cities, (Prepared for Federal Highway Administration), November 1971.

Abstract

This is a report on experience with 17 selected fringe parking facilities--located within a mile of the central business district (CBD) in Atlanta and Cleveland and between 6 and 14 miles from the CBD in Milwaukee, Philadelphia, and Seattle. Survey analyses show that a large percentage of commuters with alternatives are using fringe lots, and peak hour automobile traffic volumes are being lowered by these improvements.

The report discusses user socioeconomic characteristics as well as observed operational characteristics of the facilities studied. Generalized tendencies and preliminary indications of considerations, impacts, and implications are posited. Some generalized findings include that fringe parking facility use is apparently strongly affected by cost, convenience, safety, and travel time factors. The strongest potential for fringe parking facilities is suggested: (1) at locations on transportation corridors where there are enough home-to-CBD work trips to support good transit service; (2) where land is available in low-grade use, vacant, or already devoted to parking; (3) where nearby uses are compatible with parking; and (4) where facilities have adequate drainage, lighting, walkways, and aesthetics.

(Oram)

Peat, Marwick, Mitchell & Co., and JHK and Associates, Working Paper #3, Basic TSM Goals and Objectives, (Prepared for Federal Highway Administration), June 1977.

Abstract

This is the third Working Paper for the "Measures of Effectiveness for Multimodal Urban Traffic Management" project being performed by JHK and Associates and PMM&Co. for the Federal Highway Administration. The objective of this Working Paper is to develop and present an initial set of goals and objectives for use in formulating measures of effectiveness for preparing transportation system management (TSM) elements as required by FHWA and UMTA regulations. The recommended goals and objectives are related to each of the major actor groups likely to be impacted by TSM actions, namely: transportation system users, the community, and the managers of the transportation system (e.g., traffic engineering departments and transit operators).

(author)

Pratt, Richard H., Pedersen, Neil J., and Mather, Joseph J., Traveler Response to Transportation System Changes--A Handbook for Transportation Planners, (Prepared for U.S. Department of Transportation, Federal Highway Administration), February 1977.

Abstract

Transportation planners and decision-makers need an understanding of how travelers respond to changes in the urban transportation system if they are to correctly identify the most favorable opportunities to maximize beneficial use of highways and transit operations. This Handbook seeks to bring under one cover a compendium of knowledge based on past observation and estimation of traveler responses to different types of transportation system change. It is intended to aid transportation planners and decision-makers by providing familiarization with results obtained elsewhere and by providing insight pertinent to planning decisions concerning urban transportation options.

Traveler response to the following 10 types of transportation change is investigated: pool/bus priority lanes, variable work hours, carpooling encouragement activities, buspools/vanpools, area auto restraints, auto facility pricing, transit scheduling/frequency, bus routing/coverage, transit fare changes, and transit marketing/amenities.

Within this Handbook, Chapter I is an executive introduction. Chapter II provides a user's guide to its application. Chapter III is comprised of topical summaries addressing the 10 types of transportation system change. Each topical summary includes a digest of state-of-the-art information on how travelers respond to the system change in question, and also reviews of papers and documented case studies relevant to the subject. Chapter IV consists of an alphabetical bibliography with cross-reference lists, covering the 10 plus 14 additional types of transportation system change.

(authors)

Reichart, Barbara K., Improving Urban Mobility Through Better Transportation Management, U.S. DOT, Washington, D.C., May 1975.

Abstract

This report discusses a variety of low-cost traffic engineering and public transit operations which are available to us now and can significantly improve urban mobility. Some of the techniques discussed in the report concentrate on improving the people-moving efficiency of the existing road system through more effective management, i.e., better channelization of traffic, one-way streets, exclusive lanes for turning vehicles, and computerized traffic flow control. Some techniques aim at improving transit operations, i.e., bus lanes, bus streets, transit priority at intersections, and fringe parking facilities. Other techniques concentrate on improving utilization of the automobile through ride-sharing programs. Still other techniques attempt to reduce the demand for motor vehicle transportation services and facilities.

(Oram)

Remak, Roberta, and Rosenbloom, Sandra, "Peak-Period Traffic Congestion: Options for Current Programs," NCHRP R-169, TRB, Washington, D.C., (Remak/Rosenbloom, Santa Barbara, California), 1976.

Abstract

This NCHRP Report (#169) is the published second volume of two dealing with traffic congestion during peak periods. It developed from the third objective of the study which was the determination of "methods of reducing traffic congestion" from available solutions to different types of existing peak-period congestion problems. In addressing these problems and resultant solutions, the report assists local and state governmental bodies in assessing both the problems and solutions for congestion. Costs and benefits of the various solution methods are discussed, and specific recommendations are suggested.

(JHK and Associates)

Remak, Roberta, and Rosenbloom, Sandra, Solutions to Peak Period Traffic Congestion, Volume I: State of the Art Survey, Volume II: Options for Current Programs, August 1975.

Abstract

These documents are the interim reports of a study to identify possible solutions to peak period traffic congestion in urban areas. Volume I covers the first phase, a state-of-the-art survey of methods currently in use or envisioned to alleviate peak period congestion. The second phase (Volume II) develops packages of options to maximize the effectiveness of congestion reduction programs.

Volume I identifies and discusses 11 major categories of techniques for reducing peak period traffic: staggered and flexible work hours, shortened work weeks, pricing and regulatory mechanisms, restricting access, land-use planning, marketing, carpooling and ride-sharing, communications in lieu of travel, traffic engineering, and vehicle design factors. A review of experience with these techniques and initial conclusions on the effectiveness of each in reducing peak period congestion are offered. An extensive annotated bibliography is included.

Volume II is composed of eight "packages" of mutually supportive techniques that would maximize program effectiveness. The benefits and costs and feasibility of applying the actions are documented. Recommendations are made for the application of the proposed packages to particular problem areas, i.e., CBDs of large cities, CBDs of small cities, urban freeways and arterials, roadways with strong one-directional flow, and roadways with limited options for alternative routes. Recommendations for further research are included.

(Oram)

Sinha, Kumares C., et al., Proceedings of the Speciality Conference on Urban Transportation Efficiency at New York, New York, July 26-27, 1976. ASCE, New York, New York, 1977.

Abstract

The purpose of the conference was to define and identify the various aspects related to urban transportation efficiency and to examine the different approaches that can be taken to achieve higher efficiency and productivity in the various modes within an urban transportation system at the least possible cost. In this context, the conference program focused on low-cost innovations that have been adopted in the past or are currently being tried by various agencies and organizations. The conference concentrated more on the evidence of practicality of different proposals than on the theoretical aspects of transportation efficiency.

(authors)

Southern California Association of Governments (SCAG), A Short Range Transit Plan, Southern California Rapid Transit District (RTD), Los Angeles, May 1976.

Abstract

This document represents the Southern California Rapid Transit District's part in the development of a regional Short Range Transit Plan.

The Short Range Transit Plan is primarily oriented toward meeting the new federal requirements for a transportation systems management (TSM) element.

According to the regulations, the TSM element is to provide for short range transportation needs by making efficient use of existing transportation resources. Plans for major new facilities, such as rapid transit, are to be part of the long range element.

The Short Range Transit Plan is also intended by SCAG to assist in meeting federal requirements for the annual Transportation Improvement Program (TIP). The TIP is essentially a three-year program of projects recommended from both the TSM and the long range element of the transportation plan. According to federal regulations, the TIP must indicate priorities, include realistic estimates of costs and revenues for the program period, and discuss how improvements from the long range element and the TSM element were merged into the program.

This SCRTD Short Range Transit Plan is organized according to a format requested by SCAG. Part I discusses existing conditions for the SCRTD system. Part II presents the District's plan for improvements over the next three years. Priorities and operating improvements are discussed first, followed by the description and justification of all capital projects planned for the three-year period. The concluding section of Part II is the District's three-year financial plan.

(authors)

Stabler, Elizabeth, et al., The State of Urban Mass Transportation Research, Development, and Demonstration, Vol. III: Bus Transit, Institute for Defense Analyses, Arlington, Virginia, May 1972.

Abstract

Urban bus systems are described in this volume of the report. Their relationships to other transportation modes are drawn. The market for bus transit and costs are discussed, and the impacts of urban bus transit on patronage, operation, the public, and industry are presented.

(JHK and Associates)

Symposium, Cologne, Germany, Techniques of Improving Urban Conditions by Restraint of Road Traffic, October 1971.

Abstract

Increasing traffic in urban areas is leading to serious congestion from limited road capacity and street parking. Summaries of the papers presented at the different sessions cover: (1) objectives of and reasons for traffic restraint; (2) traffic flow and network planning; (3) parking control and bus priority measures; (4) road pricing; and (5) methods of evaluation and comparison of traffic restraint techniques.

(Oram)

Tiemann, Norbert T., "Transportation Management: A Look Ahead," Highway User Quarterly, Fall 1975.

Abstract

This article examines both the short and long range methods of obtaining more efficient usage of existing highways in order to optimize transportation flow. A full range of remedies from redesign to pricing techniques is presented to aid in reducing demand.

(JHK and Associates)

Transportation Center, University of Tennessee, Increased Transportation Efficiency Through Ride-Sharing: The Brokerage Approach, (Prepared for the U.S. Department of Transportation), January 1976.

Abstract

This report explores the feasibility of a public transportation brokerage system to achieve the following objectives: (1) identify individuals with similar travel demands; (2) determine the specific service which specific groups of people desire; (3) identify potential suppliers of ride-sharing services; (4) assist each group in finding the lowest cost means of obtaining the required service; (5) overcome the legal, regulatory, informational, sociological, and other barriers which inhibit increased ride-sharing, so that agreements between users and suppliers are consummated.

Forms of ride-sharing examined include carpooling, vanpooling, taxicab service, express subscription bus service, and fixed route transit. The comparative economies of these public transportation systems are developed. The report also discusses the benefits of increased vehicle occupancy, assessment of the computer ride-sharing market, determining demand for ride-sharing, institutional considerations, and strategies for increased ride-sharing.

(Oram)

Transportation Research Board Special Report 153, Better Use of Existing Transportation Facilities.

Abstract

This Special Report presents the results of a 3-day conference held in August 1974, in Jacksonville, Florida. Because demand for increased transportation capacity continues in the face of increased resistance to new highway construction, these papers present timely and useful information. Better use of existing transportation facilities is seen as a significant approach to solving the interrelated transportation, environment, and resource problems now faced. Introductory material discusses how the management approach can be applied to transportation. Other papers discuss research and experiences with various improvements leading to increased transportation efficiency: freeway metering and control, park-and-ride, bus priority strategies and simulation, traffic signal improvements, facility improvement/maintenance and accident considerations, pricing and work schedule changes to reduce peak period demand, and improved highway safety.

(Oram)

Transportation Research Board, Special Report 172, Transportation System Management, 1977.

Abstract

This report documents the proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board and sponsored by the Urban Mass Transportation Administration and Federal Highway Administration of the U.S. Department of Transportation in cooperation with the Institute of Transportation Engineers. The report documents both workshop activities and conference papers. Subject matters addressed included:

- Traffic Operations Improvements to Manage and Control the Flow of Vehicles;
- Preferential Treatment for Transit and Other High Occupancy Vehicles;
- Management and Control of Parking;
- Management of Demand;
- Actions to Reduce Vehicle Use; and
- Actions to Improve Transit Management Efficiency.

(PMM&Co.)

Tri-State Regional Planning Commission, Short Term Effects of Transportation Policy Changes on Auto and Transit Ridership, Interim Technical Report, August 1977.

Abstract

A set of sketch planning economic demand models has been developed to predict changes in auto and transit use based upon alternative strategies influencing travel time and cost. Major findings include the following:

- No matter what their format, strategies designed to increase the cost of CBD bound auto travel would only bring about significant reductions in peak hour auto travel if set at relatively high and and unpopular levels.
- Transit fare reductions are similarly inefficient at reducing peak hour auto travel.

- Of all the strategies addressed by the models, improvements in transit travel times would seem to have the greatest effect on reduced peak hour auto trips. The model does not, however, study the cost or feasibility of this strategy.

- The relative insensitivity of drivers to auto price changes makes moderate increases in auto user charges a relatively painless method of raising revenue to pay for the social and environmental costs of autos in the city as well as for transit alternatives.

(author)

University of Washington, Seattle, Locating and Operating Bus Rapid Transit Park-Ride Lots: A Synthesis of Experience and Some Preliminary Planning Guidelines, August 1973.

Abstract

This report reviews and synthesizes previous experiences with locating and operating park-ride lots throughout the country in such places as Seattle, Washington; Washington, D. C.; New Brunswick, New Jersey; Milwaukee, Wisconsin; and the Northeast Corridor in general. The data represent the experiences of seven municipalities and account for approximately 4,500 park-ride spaces in 13 park-ride lots serving as change of mode facilities for bus transit. The characteristics of park-ride users are investigated. Data were analyzed to determine the characteristics of trip lengths and trip times as well as the trip purpose, type of employment, trip origin, and mode to bus. Further considerations included mode of travel to work prior to the establishment of park-ride lots and environmental impact factors. From the analysis of data gathered, some preliminary and general planning guidelines relevant to the location and sizing of a park-ride facility in an urban transportation corridor are developed. References are furnished.

(Oram)

Urban Consortium for Technology Initiatives Information Bulletin, Traffic Signalization Systems, Transit System Productivity, and Institutional Framework for Integrated Transportation Planning.

Abstract

These are three of eight "Information Bulletins" developed by the Transportation Task Force of the Urban Consortium for Technology Initiatives. An "Information Bulletin" was developed for eight of the transportation need

areas which were identified as the most pressing by members of the Urban Consortium. Each Bulletin provides an overview of the current issues and problems surrounding the need. These Bulletins also provide the information base from which the Transportation Task Force selects several needs for further action.

The eight needs highlighted by the "Information Bulletins" were selected in a unique process of needs identification used by the Urban Consortium. By identifying and then focusing on the priority needs of member jurisdictions, the Consortium assures that resultant research and development efforts are directly responsive to existing or anticipated local governmental problems.

"Information Bulletins" were developed on eight needs. Two of the priority needs, "Preferential and Exclusive Lanes" and "Accelerated Implementation Procedures," are currently receiving action. The "Preferential and Exclusive Lanes" need is being addressed in the Manual for Planning and Implementing Priority Techniques for High Occupancy Vehicles: Executive Summary; Management Report; Technical Guide currently being prepared by the PTI staff. A User Design Committee, composed of representatives from Consortium jurisdictions, is guiding the preparation of this Manual. The Consortium's Steering Committee is considering the policy-oriented issues (such as streamlined grant applications) involved in "Accelerated Implementation Procedures," in consort with similar needs which have surfaced in other Consortium Task Forces. Members of the Transportation Task Force are also working with the Urban Mass Transportation Administration in ensuring that Task Force concerns are addressed in the on-going revisions to UMTA's External Operating Manual.

(authors)

Yager, Sam, and Whitehers, Douglas, Concepts for Improved Speed and Capacity of Bus/Streetcar Routes, 1976.

Abstract

The potential for a high level of at-grade transit using existing roadways is examined. Reasonably extreme levels of bus/streetcar operations are compared to subway in terms of averages and variations in speed or travel time. Factors such as speed limits, acceleration-deceleration, grade-separation, stop spacing, and boarding-fare collection are considered. A simple travel time estimation model is developed. As an initial application of the model, the effect of stop spacings is studied in some detail for subways and bus/streetcar extremes with use of representative data. Based on these data, it is tentatively concluded that:

- For four or more stops per mile surface transport can be made to approach subway speeds.
- Subway spacings should be large to provide a speed commensurate with the high cost of right-of-way and grade separation.
- Further study should be directed toward study of practical techniques for realizing the potential decrease in average and variance of delays. These might be achieved through detailed scheduling of bus/streetcars and coordination of transit schedules with traffic signals.

(authors)

III. PREFERENTIAL TREATMENT OF HIGH OCCUPANCY VEHICLES

Alan M. Voorhees, Inc., Blue Streak Bus Rapid Transit Demonstration Project, Final Report and Appendix, (Prepared for U.S. Department of Transportation), June 1973.

Abstract

Blue Streak was an express bus demonstration project to test the effects of increased levels of service on transit routes and the overall impact of a park-ride lot with express service to downtown. Blue Streak buses used the reversible lanes of Interstate 5 between their service area and downtown Seattle, and had exclusive use of a reversible ramp in the central business district.

The two and one-half year demonstration produced patronage increases in the face of overall system declines. The impact of the service on the freeway was transitory since freeway volumes were also declining. The park-ride aspect was very successful, with an estimated potential of more than twice the patronage generated by the project. Park-ride patronage was limited by the parking space capacity of the lot.

Guidelines were studied for the location of park-ride lots, the impact of exclusive transit freeway ramps was simulated, and a modal split model was calibrated.

(Oram)

Alan M. Voorhees & Associates, Right Turn on Red: Current Practices and State of the Art, October 1974.

Abstract

Right-turn-on-a-circular-red traffic signal (RTOR) is a practice which has gained wider acceptance. However, there is still disagreement on whether, where, and how RTOR should be implemented. To determine past experiences with RTOR, a literature review and a survey of state and city practices was conducted. A questionnaire sent to all 50 states revealed that 24 states presently allow RTOR as a general rule, 22 states permit it with an authorizing sign and 4 states totally prohibit RTOR. The usage of the RTOR provision in those states where it is permitted by sign varies from 0.1 percent to 64 percent of all the state-controlled signalized intersections. City RTOR practices generally follow those of their respective states.

This report is the initial output from the study whose objectives are to determine whether permitting the RTOR maneuver is desirable and to prepare guidelines for determining inclusion or exclusion of this movement. No recommendations are included within the report because of its preliminary nature and the fact that additional work is still being performed, including collecting field data, conducting simulation analysis, performing before-and-after accident analysis and legal and human factor analyses. The report does contain information on accidents, delay, capacity, level of service, gap acceptance, and signing. The data collected to date indicates that RTOR does not significantly increase accidents but does reduce right-turn delay.

(Oram)

Alan M. Voorhees and Associates, Inc., Status of the Urban Corridor Demonstration Program, prepared for U.S. Department of Transportation, Washington, D.C., August 1977.

Abstract

The U.S. Department of Transportation initiated the Urban Corridor Demonstration Program (UCDP) in 1970 to test and demonstrate low capital intensive techniques for relieving congestion in urban radial corridors. Projects in eight demonstration cities were implemented. These cities represented a wide variety of urban conditions, and their respective programs incorporated a mix of transit and highway improvement programs. This is the final summary report of the evaluation monitoring program. It summarizes the impact evaluations of the eight UCDPs with the intent of showing the relative effectiveness of the programs in different urban environments. Also included is a discussion of UCDP experience to suggest ways by which similar projects can be planned and implemented.

(PMM&Co.)

Bennett, Mark, Ho, Peter H.P., and Papocostas, "Express Bus Use in Honolulu: A Case Study," Transportation Research Record 606.

Abstract

Selected results of a series of four on-board surveys taken to monitor the use of a peak-period bus system in Honolulu are presented and compared with results of an earlier door-to-door survey. The system offers express service to two general destination areas: the Honolulu CBD and the University of Hawaii. The surveys queried riders on basic socioeconomic information, characteristics of past and present travel modes, and user perceptions about service improvements. The study findings indicated that express bus patronage was significantly higher than that of the prior bus service. A significant portion of the morning riders, however, did not use the service for their return trips. The proportion of male and female riders was about even, and, among workers, the predominant occupations were professional and technical. Almost half of all riders came from households that owned two cars. About 60 percent of CBD riders and about 40 percent of riders on the university route were former automobile drivers. Increases in patronage over the survey period were in part due to gasoline shortages during the early months of 1974. The group most affected by gasoline shortages was students, who also showed a tendency over time to adjust their activity schedules to the schedule of the express bus service.

(authors)

Bather-Ringrose-Wolfsfeld, Inc., Final Report for the I-35W Urban Corridor Demonstration Project, (Prepared for the U.S. Department of Transportation), August 1975.

Abstract

Seven objectives were established for the I-35W Urban Corridor Demonstration Project; within each objective, specific items were identified to evaluate the attainment of the objectives. The results of the evaluation are presented in this report and the report is organized by project objective. Within each of the objectives, the evaluation items are discussed. At the beginning of each objective is a summary and conclusion for that objective. Generally, each evaluation item is organized into the following three areas:

- brief description of the data collection study - this information summarizes the data collection study as presented in the "Evaluation Operations Manual";
- presentation of data - the data are presented and comments on the highlights of the data are given; and
- analysis of data - this section presents the analysis of the data along with selected statistical summaries where appropriate.

Prior to the chapters on the objectives, an Executive Summary chapter and a Project Overview chapter are presented.

Every attempt has been made in the evaluation project to rigorously apply statistics in selecting sample sizes and in completing the "before" and "after" comparisons of individual data items.

(author)

Bigelow-Crain Associates, Second Year Report: San Bernardino Freeway Express Busway Evaluation, Review Draft, (Prepared for the Southern California Association of Governments), May 1975.

Abstract

The San Bernardino Freeway Express Busway is an 11-mile, double-lane, exclusive roadway for buses. The busway lanes are physically separated by concrete and flexible barriers from those serving the automobile traffic, making it a bus rapid transit system.

A comprehensive evaluation of the busway is being carried out. This is a five-year effort assessing the operational and economic feasibility and the traveler response to the new facility. The evaluation methodology is such that findings can be related to the other major national busway experiment, the Shirley Highway Busway in Washington, D.C., and to the planning of other bus priority systems in the Los Angeles Basin and throughout the country.

(author)

Bigelow-Crain Associates, The Golden Gate Corridor Bus Priority System, (Prepared for the Urban Mass Transportation Administration), May 1975.

Abstract

This report describes and evaluates the bus priority system in operation on U.S. 101 in Marin County, north of San Francisco. The combination contra-flow and no-barrier concurrent flow reserved bus lane system has been in operation since September 1972, and has served to speed buses and increase total person flow and, therefore, the efficiency of the freeway in peak periods. Of great significance is that the improvements were realized with virtually no reconstruction and only minor operational modifications to the eight-mile segment of roadway. The Golden Gate Corridor, the bus priority system, and the transit services offered are described. The involvement of various government agencies throughout the project history is summarized. The costs of implementing and operating the system are documented.

Evaluation findings include time savings, ridership and cost effectiveness, highway safety and traffic enforcement impacts, bus schedule reliability, public reactions, and impacts on transit operating costs and efficiencies. It is concluded that this system is a highly successful operation testing innovations that have significant transferability to other urban areas.

(Oram)

Boyd, J. Hayden, et al., Evaluation of Rail Rapid Transit and Express Bus Service in the Urban Commuter Market, Institute for Defense Analyses, Arlington, Virginia, October 1973.

Abstract

This study analyzes and evaluates public transportation alternatives for serving the commuter market. The two main alternatives, rail rapid transit and integrated express bus service, are analyzed from the standpoint of full costs (both supplier and user time costs). User time costs of the two alternatives are roughly equal; however, the supplier costs of the integrated bus service are much lower than those of rail rapid transit.

Quantitative data on fuel consumption and emissions are presented, and the effects of political, regulatory, and institutional constraints are discussed.

(authors)

Caltrans, Busways, (First Annual Report), Sacramento, February 1974.

Abstract

This report, the first of a series for the California State Legislature, examines the California experience with the various bus priority schemes in practice and under study. Special attention is paid to the area of federal responsiveness and enactments.

(JHK and Associates)

Crowell, W. H., Bloch, Arnold J., and Ingram, Gregory K., Carpools, Vanpools and High Occupancy Preference Lanes: Cost Effectiveness and Feasibility (Volume 4), May 1977.

Abstract

Our cost-effectiveness analyses suggest that employer-based voluntary carpool and vanpool matching programs are quite attractive in the four urban areas studied. The reductions in VMT can reach 2 to 3% even in the complete absence of any mandatory restrictions. These seemingly small reductions represent big reductions in VMT, and big savings in dollars for the user public. For example, a simple 1% reduction in the Washington, D.C. annual VMT represents an 80 million VMT reduction, and a cash savings of $4,800,000 to travelers - all at a meager expense of $150,000; the savings would be seven times as great in Los Angeles. Similarly improved existing lane capacity (HOVL) for auto to bus use (during peak congestion hours) can yield 1/2 to 1% reductions in VMT, and consequent cash savings to travelers. These results indicate that voluntary carpool and vanpool matching programs, and HOVLs can be quite cost-effective even at very low VMT reduction levels; it also shows, however, that these voluntary programs cannot yield the high reduction characteristics of programs that would utilize mandatory restrictions as well.

(author)

Engineering Experiment Station Ohio State University, Development of Guidelines For the Application of Continuous Two-Way Left-Turn Median Lanes, (Prepared for Ohio Department of Transportation), July 1975.

Abstract

The objectives of the research project are to consolidate existing information on continuous two-way left-turn median lanes as a practical measure for increasing the capacity and improving the safety of multi-lane arterials by accommodating mid-block left-turns and to conduct before and after studies at sites which were selected in cooperation with the Ohio Department of Transportation. The research approach selected includes studies in four distinct areas: (a) literature review; (b) a nationwide expert opinion survey, including some personal interviews; (c) a small scale simulation study; and (d) before-and-after field studies. This report presents the results of the literature review and the opinion survey. Both the literature review and the survey indicate that two-way left-turn lanes work well in spite of a wide variety of methods of signing and marking. There is a uniform agreement

that these lanes have excellent safety records and specifically head-on collisions are practically nonexistent.

(Oram)

Federal Highway Administration, Simulation of Urban Bus Operation on Signalized Arterials, December 1973.

Abstract

This report describes a simulation model that represents urban bus operation on signalized arterial streets. The model can be used as an evaluation tool in the formulation of new schemes to improve bus service in urban areas.

To pave the way for the development of such a model, two basic relationships in urban bus systems were investigated. They respectively involve: (1) the time required to load and unload a certain number of passengers, and (2) the bus speed and acceleration characteristics.

The model developed was named "SUB" (Simulation of Urban Buses) and its program written in FORTRAN language. Traffic is simulated on the model by groups of vehicles that are processed at constant time intervals. Buses, on the other hand, are represented individually and processed only when significant events occur.

The model has been calibrated in Washington, D.C., verified and subjected to sensitivity tests. It has been validated by comparing its results with real-life data, and its usefulness has been demonstrated by applying the model to predict the effect of an exclusive bus lane.

(Oram)

Garcia, Jesus M., Exclusive Bus and Carpool Lanes Installed and Operated by the State of California, Caltrans, Sacramento, February 1975.

Abstract

The 17 California priority and exclusive lane projects in service at the beginning of 1975 are fully detailed in this report. Special emphasis is placed on the legal and legislative aspects which permit and encourage priority treatments in California.

(JHK and Associates)

Kulash, Damian J., and Bhatt, Kiran U., Preferential Bus Systems, The Urban Institute, Washington, D.C., March 1972.

Abstract

This paper describes various types of preferential bus operations, as well as techniques which have been used to plan and develop these systems. Problems associated with these techniques are discussed, and a proposal is set out for research on the evaluation of preferential bus systems which would help overcome current methodological problems.

(author)

The Institute of Transportation and Traffic Engineering, Simulation of Priority Strategies at Freeway Ramps, May 1975.

Abstract

This report describes the development, computerization, and application of an analytical procedure for entry control at freeway ramps. Two types of control strategies are developed: control on a passenger basis and control on a vehicle basis.

The analytical procedure encompasses two models. The first is a simulation model that predicts freeway traffic performance as a function of design and allowable ramp flows. The second is a decision model that selects a control strategy meeting the constraints and stated objectives.

The simulation model was validated under field conditions, and the predicted traffic performance compares very favorably to actual, measured traffic performance. The two models were integrated and computerized, and the composite model was applied to a number of sites to demonstrate its applications and to provide some results for possible implementation.

(Oram)

Levinson, Herbert S., et al., "Bus Use of Highways: Planning and Design Guidelines," NCHRP R-155, (TRB, Washington, D.C.), Wilbur Smith & Associates, New Haven, Connecticut, 1975.

Abstract

This report will be of particular interest to public officials responsible for transportation policy, planning, design, and engineering. It contains guidelines for planning and designing preferential bus facilities relating to freeways, arterials, and terminals. Transportation engineers and planners will find the report of special value in helping to identify appropriate bus priority treatments for specific urban situations. In addition, the report will help the designer to incorporate the essential characteristics required for each type of treatment. It constitutes a single reference source on bus priority measures.

(Oram)

Levinson, Herbert S., et al., "Bus Use of Highways: State of the Art," NCHRP R-143, (TRB, Washington, D.C.), Wilbur Smith & Associates, New Haven, Connecticut, 1973.

Abstract

This report will be of particular interest to those highway officials responsible for planning, design, and traffic engineering. It constitutes a state-of-the-art of bus utilization of highway facilities and, therefore, contributes to a better understanding of the effectiveness of bus operations on highways in terms of priority treatments relating to freeways, arterials, and terminals. Highway engineers will find this report of special value in helping to identify the multimodal potentials of urban freeway projects, as well as in evaluating the impact of bus operations on the capacity and traffic flow characteristics of existing roadway facilities.

(Oram)

Levinson, Herbert L., and Sanders, David B., Reserved Bus Lanes on Urban Freeways: A Macro Model, Wilbur Smith & Associates, New Haven, Connecticut, January 1974.

Abstract

An increasing number of cities are becoming interested in operating buses on reserved lanes to move people more effectively. This paper develops a person-delay model which can be used in determining the feasibility and practicality for implementing a contra-flow freeway bus lane in urban areas. The model deals with peak-hour trips on a six-lane two-direction freeway, and it uses relationships as established in the Highway Capacity Manual, 1965, to demonstrate its applicability. The derivation of the model is shown, and the paper then depicts how transportation planners can easily use it by way of a step by step procedure.

(authors)

Link, Dan, The Preferential Treatment of Multiple Occupancy Vehicles in a Transportation Corridor, School of Architecture & Urban Planning, UCLA, Los Angeles, June 1973.

Abstract

In the study of multiple occupancy lanes, this report investigates three major areas of concern: transportation potential, engineering feasibility, and cost, utilizing as models, the Hollywood/Golden State Freeways in Southern California. Two areas of improvement are suggested: first, having multiple occupancy vehicles by-pass other traffic at metered on-ramps; and second, utilizing and establishing contraflow lanes on the off-peak directional roadways.

(JHK and Associates)

McQueen, James T., Levinsohn, David M., Waksman, Robert, and Miller, Gerald K., The Evaluation of the Shirley Highway Express-Bus-On-Freeway Demonstration Project, Final Report, National Bureau of Standards, (Prepared for UMTA), August 1975.

Abstract

The Shirley Highway Express-Bus-On-Freeway Project began in June 1971 and ended December 31, 1974. The principal goal of the project was to demonstrate that express bus-on-freeway operations can improve the quality of bus service and lead to an increase in the people moving capability of peak period transportation facilities for an entire urban corridor. Secondary project goals were to demonstrate the effectiveness of this technology as a means of reducing auto pollutant emissions and gasoline consumption, improving the mobility of the transportation disadvantaged and the economic condition of the transit operator.

This report summarizes project performance with respect to the attainment of the above goals. An analysis of bus operations is presented which shows that the project effected an improvement in the quality of the Shirley Highway Corridor bus service as evidenced by the reduction in travel times by bus, and the increase in both the reliability and the coverage of the bus system. Trends in peak period traffic volumes are presented which show that the subsequent increase in bus patronage and bus' share of Corridor commuters led to an increase in the peak period people moving capability of the Corridor. Corridor people moving capability was also increased by project stimulated growth in carpooling.

Data from surveys of Corridor commuters were used in identifying factors important in commuters' decisions to use bus or to carpool. Bus users who formerly had commuted by auto reported that the most important factors in their decisions to switch from auto were the expense and discomfort of commuting by auto, and the express features of project bus service. Factors reported as most important in decisions to join or form a carpool were reduction in commuting costs, special parking privileges for carpools, and availability of the express busway to carpools.

The report concludes with an analysis of project performance with respect to the secondary goals. The project resulted in significant reductions in peak period auto usage, auto pollutant emissions and gasoline consumption. The utilization of project bus service by transportation disadvantaged persons is discussed and project costs and revenues are analyzed.

(Oram)

McQueen, James T., and Waksman, Robert, Increasing the People Moving Capability of the Shirley Highway, (Prepared for 56th Annual Meeting of the Transportation Research Board), 1977.

Abstract

With the dramatic increase in rapid rail transit construction costs in recent years, the exclusive highway right-of-way for high-occupancy vehicles has emerged as a possible cost-effective alternative for transporting peak period commuters through congested corridors. The Shirley Highway Busway, a section of which was opened to buses in 1969, was the first such exclusive right-of-way. Opened to carpools with four or more members in December 1973, it was the principal element of the Shirley Highway Express-Bus-on-Freeway project which ended December 1974.

Priority treatment accorded buses and carpools resulted in an improvement in the corridor's people moving capability, where people moving capability is measured in terms of both the magnitude of people moved and the effectiveness with which they are moved. Peak hour person throughput on the Shirley Highway was increased substantially. In addition, considerable travel-time savings were realized by all commuters using the Shirley Highway.

This paper is divided into two parts. The first part discussed increases in the people moving capability of the Shirley Highway. The second part discussed the reasons underlying those trends. The trends are based on extensive auto and transit volume counts taken over the life of the project.

The increases in the people moving capability of the Shirley Highway can be attributed to increases in the use of bus and carpools.

(authors)

Miller, Gerald K., and McQueen, James T., "Park-and-Ride in the Shirley Highway Corridor," Transportation Research Record 606.

Abstract

The market for fixed-route transit operations is not limited to travelers living within walking distance of transit stops. As demonstrated by the Shirley Highway Express-Bus-on-Freeway Project, well-planned park-and-ride operations can lead to sizable increases in bus patronage. Park-and-riders, commuters who travel by automobile to a bus stop and then by bus to work, greatly expanded the market for the fixed-route bus service in the Shirley Highway corridor. After briefly describing the park-and-ride arrangements in this suburban corridor, this paper presents the results of an investigation of the perceptions and mode choice influences of the park-and-riders at two new lots. On-board surveys were used to determine the importance of 12 factors in the commuter's decision to switch from automobile to park-and-ride bus service. The users' subjective satisfaction assessments for these factors and their reported travel-time and costs savings (or losses) were also obtained. These results suggest that several factors in addition to time and cost should be considered in planning park-and-ride facilities.

(author)

Minister, R. David, et al., A Computer Simulation Model for Evaluating Priority Operations on Freeways, ITTE, Berkeley, California, June 1973.

Abstract

This report describes the operation of a computer program, PRIFRE, developed to evaluate priority operations on freeways. Model and program background and structure are discussed; application procedures are described.

PRIFRE was developed primarily to evaluate one-way "normal" priority lane operations, i.e., reserved lane(s) on the same side of the freeway median as the unreserved lanes. However, with some manual interfacing, PRIFRE can be used to evaluate contra-flow lanes, separate busways, and ramp control schemes affording priority entry to high-occupancy vehicles.

PRIFRE can calculate total travel time expended under normal freeway operations and total travel time expended under different priority operation strategies, and compare the two. Any travel time difference (savings or losses) is noted in the final output. Similarly, PRIFRE can also calculate total vehicle miles accumulated under normal and priority operations, and compare the two. Any variety of occupancy shifts, number of priority lanes, modal splits, and growth periods can be input to the program and results calculated and compared using PRIFRE.

(Oram)

Mitre Corporation, Overview of Experimental Bus Priority Systems, 1975.

Abstract

The bus priority strategies tested in eight different cities used a variety of signal control techniques to award priority to buses at traffic control intersections. The reported results range from seven seconds reduction in average bus delay at one intersection in Leicester, England, to 24 seconds reduction in average delay at an intersection in Bern, Switzerland. But, more important, the range of travel time through an intersection in Derby, England, was reduced by more than one half. Such reduction in the range of travel time has a significant impact on reducing run time variation along a bus route.

In Washington, D.C., 34 intersections were equipped with bus detectors which fed bus arrival information to the central Urban Traffic Control System/Bus Priority System computers. Whenever a bus was detected, this bus priority system used either green signal extension or red signal truncation to reduce bus delay at the BPS intersection. In Bern, Switzerland, the normal one-green phase per cycle was split into two green phases of equal length, with the capability of extending either of the green phases whenever a tram was detected. This resulted in a 75 percent reduction in delay time for trams and a 50 percent reduction in delay time for buses.

The U.S. and European approaches to the BPS demonstrations differ in that U.S. BPS demonstrations range in size from 3 to 34 intersections and emphasize hardware and software development. In contrast, the BPS demonstrations conducted in foreign countries typically include one intersection and stress studies of how much the mean travel time and the range of travel time through the intersection have improved with priority as compared to buses operating without priority.

(Oram)

Mitre Corporation, Simplified Estimators for Benefit Assessment of Bus Priority Systems, (Traffic Signal Preemption), August 1975.

Abstract

Simulation studies indicate that a Bus Priority System (BPS) that guarantees a green traffic signal to buses approaching an instrumented intersection provides substantial benefits to buses with little detriment to other traffic. Simplified estimators that correlate well with many aspects of the simulation results provide a better understanding of the BPS process and a means of analyzing the effects of BPS in applications other than that simulated. A bus travel time estimator predicts values within 10 percent for local buses, although the accuracy is less for buses with less frequent stops. An intersection capacity estimator reflects how certain conditions lead to greatly increased travel times for other vehicles in the simulation network and how far-side bus stops are superior to near-side bus stops at short bus headways.

(Oram)

Mitre Corporation, Unconditionally Preemptive Bus Priority System: Summary of Simulation Results, (Prepared for the Urban Mass Transportation Administration), July 1975.

Abstract

A large number of simulation runs of an urban network traffic model have been used to evaluate a Bus Priority System (BPS) algorithm that automatically grants a green signal to buses as they approach an intersection. BPS was found to provide substantial travel time improvements (20 to 30 percent) to buses in local service (frequent stops), limited service (infrequent stops), and express service (no stops). The disrupting effect of BPS on cross-street traffic is much less when far-side bus stops instead of near-side bus stops are used. The use of BPS also reduced the delaying effect of buses on other traffic. For all conditions tested, total passenger travel time per hour of system operation improved when BPS was used.

(Oram)

National Bureau of Standards, The Shirley Highway Express-Bus-On-Freeway Demonstration Project: A Study of Reverse Commute Service, January 1975.

Abstract

The Shirley Highway Corridor (I-95) peak period bus service has been overwhelmingly oriented toward trips made in the direction of the primary flow of peak period traffic. However, in early 1973, peak period reverse commute service was established on three Shirley Highway Express-Bus-on-Freeway Demonstration routes. Reverse commute service is an operation which provides peak period transit service in the direction opposite the primary flow of peak period traffic. This report is based upon an analysis of these reverse commute routes. The purpose of the report is to: (1) describe the Shirley Highway peak period reverse commute routes; (2) analyse success of reverse commute service; (3) determine factors conducive to the success of reverse commute service; and (4) identify employment areas within the Shirley Highway Corridor which have high potential as markets for a reverse commute service. In early 1973, two major reverse commute routes began service to a newly opened high-rise office building in Northern Virginia. After 11 months, patronage was measured. Responses to an on-board survey of riders, taken in February 1974, revealed that at least 43% of riders had no other means than bus for getting to work. The service has enabled many of these riders, therefore, to accept jobs that they might otherwise have had to forego. The service was also found to be slightly profitable to bus operators on an incremental cost basis. Cost and revenue estimates showed that the bus operators' margin of income over costs was positive. It was concluded that because the reverse commute service was beneficial to its users and slightly profitable to the bus operator, it has been a successful operation. Conditions deemed important to success are delineated.

(Oram)

National Cooperative Highway Research Program Optimizing Flow of Existing Street Networks, Report 113, 1971.

Abstract

This report will be of special interest to traffic engineers, public works administrators, and other city officials interested in improving the traffic-carrying ability of city streets. The project is unusual in that it is one of the few research endeavors that has actually demonstrated methods of improving traffic flow on complex networks of city streets as compared with spot or arterial improvements. Dozens of traffic engineering improvements were implemented and evaluated. Newark, N.J., and Louisville, Ky., were selected as test cities for this $1 million study, which sought ways for middle-sized cities to expedite their local traffic without expensive reconstruction. The research clearly indicates, through examples, the benefits that can be achieved for the motoring public by application of traffic engineering knowledge to improve traffic flow and prevent costly travel delays.

(Oram)

NATO Committee on the Challenges of Modern Society (CCMS), "Bus Priority Systems," CCMS Report No. 45, TRRL (Transport and Road Research Laboratory), Crowthorne, England, 1976.

Abstract

This report is concerned with "Bus Priority Systems" - a topic chosen for study because of the growing need to make bus travel more attractive and more competitive with the private car.

Increasing car usage in urban areas has been the major factor responsible for the serious decline in bus patronage over the past 30 years and for a decrease in bus operating efficiency, due in particular to peak-period congestion. A careful study of bus priority measures is therefore warranted because such measures not only aim to free buses from the effects of traffic congestion but also to improve their performance relative to the private car, thus helping to redress the balance between bus and car usage. Bus priority is also consistent with recent policies concerning the need to improve the environment, to avoid high-cost solutions to traffic and transport problems and to conserve energy. The study of measures to afford priority to buses, and other high-occupancy vehicles such as carpools, is therefore most timely.

Four countries agreed to take part in the study of bus priority systems: U.K. (in charge of the project), France, Canada, and U.S.A. The objectives of the group's work were: to study bus-priority measures and produce a state-of-the-art report describing the various types of schemes available, methods of assessment, results obtained, and any problems concerning implementation, enforcement and accidents; to give guidance on the most suitable types of priority for different situations; to identify gaps in the available knowledge and to encourage authorities to provide, where appropriate, adequate evaluation of bus-priority schemes, especially those which include novel features; to select a number of practical examples to illustrate the range of bus-priority measures, preferably where full economic assessments have been carried out; and to make recommendations which can be placed before the NATO Council for their consideration and dissemination to member governments.

(author)

Planning and Research Division, Unified Work Program, Express Bus Service Evaluation, Port Authority of Allegheny County, September 1974.

Abstract

This report provides descriptive background information on express bus lanes and how they will potentially benefit the Pittsburgh area. The second part of the report describes the specific recommendations for exclusive bus lanes. These recommendations include numerous downtown street and arterial as well as several limited access facilities. Experience with express bus in other areas is briefly documented.

(PMM&Co.)

Rothenberg, M. J., and JHK and Associates, Priority Treatment for High Occupancy Vehicles: Project Status Report, March 1977.

Abstract

This report discusses the current status of 14 preferential treatment projects for buses and carpools in the United States. The range of projects covered includes bus and carpool lanes physically separated from the flow of other traffic, contra-flow lanes, exclusive median with-flow lanes, bypasses of metered freeway ramps, and toll reductions for carpools. Key historical events in the development of each project are cited and observations are made on the effectiveness of each. This report is part of FHWA's Federally Coordinated Program (FCP) research project 2D, which is titled "Research on Priority Techniques for High Occupancy Vehicles." Several of the 14 projects discussed herein as well as other additional projects will be given detailed evaluation in the near future.

(authors)

Simkowitz, Howard J., A Comparative Analysis of Results from Three Recent Non-Separated Concurrent-Flow High-Occupancy Freeway Lane Projects: Boston, Santa Monica and Miami, (prepared for 5th Annual Meeting of the Transportation Research Board), 1978.

Abstract

Results from three recent non-separated concurrent-flow high-occupancy freeway lane projects, Boston's Southeast Expressway, the Santa Monica Freeway in Los Angeles, and Miami's I-95, are compared. The project sites and projects are described and contrasted. The following issue areas are explored: supply - changes in travel times on the freeways, changes in transit level of service; demand - modal shift to carpooling and transit induced by the reserved lane; project costs - capital and operating, including express bus costs; safety and enforcement - changes in accidents and incidents, violation rates, enforcement; and institutions and attitudes - the public's attitude towards the reserved lane concept, the effect of advertising and media reports, the role of politics. Conclusions are drawn and recommendations are made concerning future reserved lane projects.

(author)

Stanford Research Institute, Guidelines for Design and Operation of Ramp Control Systems, (Prepared for National Cooperative Highway Research Program), December 1975.

Abstract

This report is intended as a guide to designers of ramp metering control systems. It is aimed at the working traffic engineer who has had a minimum of freeway operations experience. The emphasis is on practical and proven techniques, not on research or on experimental procedures. As a first step, the report provides guidance in determining whether a proposed metering system is potentially effective. Assuming that cost and related criteria are met, guidelines are given for the design, implementation, and operation of systems using three types of metering: Pretimed, Locally Actuated, and Centralized/Interconnected. Multiple-System Metering is also treated briefly. A final chapter cites the benefits and costs of ramp metering at a number of existing locations and describes techniques for a specific benefit-cost study.

(Oram)

Stock, William A., Wang, Jin-J., and May, Adolf D., Priority Lane Operations on the San Francisco-Oakland Bay Bridge, ITTE, Berkeley, California, April 1971.

Abstract

The two mathematical models EXCBUS (6) and FREEQ (10) were applied to this heavily traveled freeway section, and various priority lane schemes were tested for their potential travel-time savings. Optimum strategies showed some savings could result if such a priority lane operation were implemented in the westbound a.m. peak directions.

(authors)

Systan, The Santa Monica Freeway Diamond Lanes: Evaluation Volume I, II, and III, (Prepared for the U.S. Department of Transportation), April 1977.

Abstract

This three-volume effort is intended to comprehensively review and evaluate the Santa Monica Freeway Diamond Lanes. Much controversy surrounds the implementation, operation, and discontinuation of the bus and carpool lanes. The report seeks to document the transportation and safety implications of the program bus operations and ridership aspects, and environmental and public response impacts.

(PMM&Co.)

Technology Sharing Program, Priority Techniques for High Occupancy Vehicles: State-of-the-Art Overview, Transportation Systems Center, DOT, Cambridge, Massachusetts, November 1975.

Abstract

This report presents an overview of priority techniques for high occupancy vehicles, a set of transportation improvements that make more efficient use of existing vehicle and highway capacities. The report is designed to make more accessible the body of knowledge that now constitutes the state-of-the-art in priority techniques. Included are discussions of the role of priority techniques, as well as the characteristics of freeway and arterial/street priority applications. An evaluative overview presents implementation guidelines, decision-making criteria, and a discussion of impacts.

A special feature is the inclusion of supplementary material to serve as a source-book for further information.

(Oram)

Transportation System Center, UMTA Service and Methods Demonstration Program: Annual Report, November 1975.

Abstract

This report contains a description of the Service and Methods Demonstration Program. Transit demonstration projects undertaken in previous years are reviewed. Recently completed and current demonstration projects are described and project results from similar demonstrations are compared. The comparisons are made by grouping projects according to the program objectives addressed: (1) decrease transit travel time; (2) increase transit reliability; (3) increase transit coverage; (4) increase transit vehicle productivity; and (5) improve the mobility of transit dependents. Independent activities carried out in support of the demonstrations are described, such as the development of evaluation guidelines and improved methodologies for demonstration evaluation, analytical studies in support of the development of experimental demonstrations, and case studies of independent local innovations. Information dissemination mechanisms and activities intended to facilitate more widespread knowledge of effective approaches to improving transit are discussed. The Appendix contains a detailed description of each demonstration project including the objectives, history, status, results, evaluation and conclusions.

(Oram)

Tri-State Regional Planning Commission, Urban Corridor Demonstration Program - Exclusive Bus Lane: Interstate 495 - New Jersey Approach to Lincoln Tunnel, July 1972.

Abstract

December 18, 1970 marked the establishment of an exclusive bus lane for east-bound (city-bound) buses along a 2.5 mile stretch of Interstate 495 between the Lincoln Tunnel and the New Jersey Turnpike. This experiment was a part of the U.S. Department of Transportation's Urban Corridor Demonstration Program. The project serves as an example of how a significant public transportation improvement can be established quickly at a relatively low cost in an urban area where several planning and operating agencies exercise jurisdiction. The report reviews the plan for coordinating the inputs and activities of the Urban Mass Transportation Administration, the Federal Highway Administration, the Tri-State Regional Planning Commission, the New Jersey Turnpike Authority, New Jersey Department of Transportation and the Port of New York Authority. Also discussed are the bus eligibility criteria and traffic-control devices used as well as the public information campaign which was carried out. Significant data on the project include the fact that the reverse-flow exclusive lane shuttles thousands of commuters daily at a time saving varying from 10 to 25 minutes. In 1971, more

than 206,000 buses and 8.7 million riders used the lane. During the peak commuting period an average of 809 buses carrying 34,000 passengers used the lane. Few delays were experienced; during 1971, there were only 25 stoppages for such diverse reasons as engine problems and flat tires. The success of the project is established in the analysis of commuter response surveys, etc. Results suggest that 2,300 commuters have become bus riders since the lane's inception.

(Oram)

Traffic Systems Division Office of Research, Federal Highway Administration, Urban Freeway Surveillance and Control: State of the Art, July 1973.

Abstract

This publication surveys today's state of the art in urban freeway surveillance and control systems. Some surveillance and control aspects, such as ramp metering, are beyond the research stage, and these systems are now eligible to be implemented with federal participation. Until now, however, only a few qualified engineers have known when and where such systems should be installed and how they should be operated. This report should assist others in obtaining this specialized knowledge, and should result in the implementation of freeway surveillance and control systems in many urban areas where freeways become congested. With the current trend of limiting the construction of new controlled-access facilities, it becomes even more important to be able to operate the exsiting facilities at optimum safety and efficiency.

The document is so organized as to introduce the reader first to freeway problems that are subject to solution by surveillance and control techniques. Measures and methods to document operational problems are discussed to aid the analyst in determining what surveillance and control systems should be considered. Solutions to freeway problems are presented along with descriptions of the detailed hardware requirements. A summary of existing freeway ramp control projects is presented, and a benefit-cost study of their effectiveness is provided.

(Oram)

U.S. Department of Transportation, Preferential Facilities for Carpools and Buses, Seven Reports, FHWA, DOT, Washington, D.C., May 1976.

Abstract

These seven reports on preferential facilities for carpools and buses have been assembled and reprinted by the Federal Highway Administration. The reports provide information on several recent projects to increase the person-moving capacity of the highway system by designating facilities for preferential use by high-occupancy vehicles.

Facilities covered include bypass lanes in Los Angeles, HOV lanes in Los Angeles and San Francisco, the Banfield Freeway, I-95 in Miami, Connecticut's carpool program, I-93 in Boston, and bus and carpool lanes in Hawaii.

(JHK and Associates)

U.S. Department of Transportation, Summary Report, Feasibility and Evaluation Study of Reserved Freeway Lanes for Bus and Carpools, January 1971.

Abstract

This research study was undertaken to ascertain whether the reserved-lane concept will accommodate more people on urban highways during peak traffic periods and, at the same time, reduce vehicular congestion during these periods. Specific major objectives of the study were as follows:

- To determine the feasibility of moving more people with fewer vehicles and improving traffic operation on a given freeway by reserving one or more lanes for the exclusive use of buses and car pools during normal weekday peak periods; and
- To develop a plan for demonstration and evaluation of the operational effectiveness of the reserved-lane concept.

Development of a demonstration and evaluation plan (the second objective) was contingent upon demonstration of feasibility in the first phase of the study. Research objectives were pursued through the performance of the following project tasks: (1) an analysis of freeway types and reserved-lane rules to determine the general potential of the reserved-lane concept; (2) the selection of a specific freeway site for a detailed feasibility study; (3) a detailed traffic operations analysis to determine the implications of the reserved-lane concept; (4) a user-cost analysis comparing reserved-lane operation with normal operation; (5) a mode-choice analysis to estimate potential shifts from low-occupancy vehicles to car pools and buses; (6) an investigation of the legislative and enforcement requirements involved in implementing the reserved-lane concept; (7) an assessment of requirements for a public information and education program to support concept implementation; and (8) the formulation of an implementation plan for demonstration of the reserved-lane concept.

(author)

Urban Consortium, A Manual for Planning and Implementing Priority Techniques for High Occupancy Vehicles, July 1977.

Abstract

This Manual on Planning and Implementing Priority Techniques for High Occupancy Vehicles consists of three documents which, when taken together, describe a project development process and administrative procedures that relate project performance to community priority, costs, and phasing. These are primary concerns of top policy makers when considering the approval of new proposals.

This Program Manager Report is an advisory document for senior personnel or department heads who staff, plan, and manage priority treatment projects.

The Chief Executive Report is an explanatory review for local administrators and elected officials who approve preferential treatment policies and whose continued support is essential to project implementation.

The Technical Guide is used by members of an interagency project team which conducts day-to-day activities in application areas selected by management.

Priority techniques have been successfully used in Boston, Honolulu, Los Angeles, Miami (Florida), Minneapolis, New York City, Portland (Oregon), San Francisco, Seattle, and Washington, D.C., among other places. A diverse group of local officials has evaluated this body of experience for its applicability and has helped document the techniques for transfer to other jurisdictions. Since the documents are intended for practical use by local and state governments, and local circumstances vary significantly, no attempt is made to recommend a specific approach to project implementation.

(author)

Vuchic, Vukan R., and Stanger, Richard M., Lindenwald Line and Shirley Busway: A Comparison, University of Pennsylvania, Philadelphia, January 1973.

Abstract

This study utilizes two existing systems for a comprehensive comparative study of bus and rail technologies and their different types of operations. It differs from all previous studies in two respects. First, it performs the analysis on two actual systems; thus it does not utilize any hypothetical assumptions. Second, it includes more system characteristics than any of the previous studies. An attempt has been made to make the study as comprehensive as the available data permit.

(authors)

Washington State Department of Highways, Encouraging Multiple Occupancy of Vehicles Using Toll Facilities, November 1972.

Abstract

This report is concerned with the feasibility of modifying the toll charges on certain toll facilities to encourage multiple-passenger use of private and public transportation vehicles. The report discusses the need for additional capacity along State Road 520, and explores the feasibility of adjusting toll policies on the Evergreen Point Bridge over Lake Washington to reduce the need to construct additional roadway capacity. Observed trends in vehicle occupancy are discussed as well as an analytical procedure (a form of a modal split model) to estimate the effect of various toll and reserved lane schemes on automobile occupancy levels and peak hour traffic demands. Measures that were considered include abolishment of commuter discounts, establishment of discounts for carpools, permitting carpools free use of the facility, and others. For comparative reasons, the effect of enabling a five minute time savings for high occupancy vehicles was also simulated. A conclusion is that changes in toll structure on the bridge would have a lesser effect on average vehicle occupancy than time savings resulting from improvements for carpools and transit use.

(Oram)

Washington State Department of Highways, I-35 Urban Corridor Demonstration Project: Final Report, August 1975.

Abstract

The purpose of the I-35W Urban Corridor Demonstration Project was to implement and evaluate the Bus-on-Metered Freeway System. The system concept includes the following elements:

- metering of an urban radial freeway;
- a real-time surveillance, command and control system;
- extensive express bus service in the corridor;
- priority access to the freeway via express bus ramps; and
- provision of transit passenger amenities, i.e., bus shelters, signs, and park-ride facilities in the corridor.

Initial planning for the project was completed in September 1971. Express bus service was begun in the Fall of 1971; nine new express bus routes were initiated in December 1972. Three additional routes were added during 1973 and 1974, for a total of 17 routes as of December 1974. The complete Bus-on-Metered Freeway System became operational in April 1974.

This report evaluates the attainment of the seven project objectives:

- Improve the I-35W Corridor Level of Service through Ramp Metering.
- Increase the Transit Modal Split in the Corridor.
- Improve the Reliability of the Freeway Operation.
- Improve the Transit System Performance.
- Obtain User Acceptance of the Bus-on-Metered Freeway System.
- Obtain a Positive Environmental Impact for the Project.
- Implement the Bus-on-Metered Freeway System in a Cost-Effective Manner.

(Oram)

Wilbur Smith and Associates, in association with Sverdrup and Parcel and Associates, Inc. and Stanford Research Institute, GCA Technology Division, Wyle Laboratories, Bus Rapid Transit Options for Densely Developed Areas, February 1975.

Abstract

This report describes and evaluates alternative bus rapid transit systems in densely developed urban areas. It reviews the state-of-the-art, identifies significant options and technologies, and assesses their cost, service, and community impacts. It is intended as a guide for community leaders and transportation planners interested in providing fast, reliable metropolitan bus rapid transit service.

The report provides guidelines for providing bus rapid transit in densely developed areas without freeways. This need has been a principal concern of bus rapid transit planning, since ways to optimize regional express bus service--including preferential treatment for buses on urban freeways--have been well documented.

(Oram)

IV. CARPOOL AND VANPOOL PROGRAMS

Alan M. Voorhees & Associates, Inc., and Behavior Science Corp., A Study of Techniques to Increase Commuter Vehicle Occupancy on the Hollywood Freeway, Los Angeles, November 1973.

Abstract

As a submission to Congress by the Secretary of Transportation, this study realized by investigation the effectiveness of carpool projects previously authorized by DOT. It continued the study of other measures such as tax and economic incentives to promote carpools. Several recommendations were made in the federal area to increase participation, extend projects, and make allocations in special cases. Attention was drawn to the most important state and local levels, where project development was stressed and employer action sought.

(JHK and Associates)

Baltimore Regional Planning Council, Vanpooling: A New Low Capital Transportation Alternative, November 1975.

Abstract

This report discusses the low capital transportation alternative of vanpooling. The benefits of vanpooling for individual users, employer-sponsors, and society are analyzed. The market potential for vanpooling is analyzed generally and specifically for the Baltimore region. Legal issues concerning the implementation of vanpooling are explored. Possible and likely sponsors of vanpooling programs are discussed, and guidelines for instituting an employer sponsored vanpool program are suggested. The potential role of state and local governments in fostering and ensuring the success of vanpool programs is developed. An appendix provides information on an implemented vanpooling program, The 3-M Commute-a-Van Program.

(Oram)

Bert, Mathew, Vanpooling: A Technique for Estimating Impacts, Technical Memorandum Number 34, (Prepared for the Baltimore Regional Planning Council, Maryland Department of Transportation), June 1977.

Abstract

The memorandum estimates maximum vanpool potential in the Baltimore region based on a sketch plan modeling technique. Estimates of vanpool formation in 1975 and 1985 with expected VMT, fuel consumption, and air pollution reductions are made. The appendices include the computational variables used in the vanpool impact analysis and flow charts of computations.

(PMM&Co.)

Bryant, David A., Study and Evaluation of Computer Carpool Programs in Certain Metropolitan Areas, GCA Corp., Bedford, Massachusetts, April 1974.

Abstract

The report methodology is adopted in certain metropolitan areas to arouse public interest and support for carpooling by the use of computer matching to reduce the total number of vehicles committed to work trips, reduce the demand for scarce motor fuels, and reduce vehicle miles traveled. All these combined will contribute to the improvement of air quality in congested work areas in metropolitan centers.

(author)

Bush, Leon, Response to Carpool Matching Programs: A Case Study, The Aerospace Corp., El Segundo, California, (DOT, Washington, D.C.), January 1975.

Abstract

Car pool computerized matching programs have been initiated at many companies. Some statistics are available on the number of applicants, but less is known regarding the number and characteristics of car pools actually formed as a result of the matching process. This paper documents the results of car pool efforts at the Aerospace Corporation and the Air Force's Space and Missile Systems Organization, two employers collocated at

El Segundo in the Los Angeles basin. Employee demographic and transportation statistics prior to the initiation of a computerized car pool matching program are described, as well as the subsequent response based on a 25 percent sample telephone survey. Results are presented in terms of number and size of car pools formed, motivating factors for forming or avoiding car pools, and correlations with parking lot vehicle counts. Since the period covers the time of the rise and fall of the national gasoline shortage, some observations are presented on those effects, and on the application of these results to other company and area-wide car pool matching programs.

(author)

Bush, Leon, and Todd, George J., Vanpool Implementation in Los Angeles, The Aerospace Corp., El Segundo, California, November 1975.

Abstract

This paper documents the formation and operation of a very successful vanpool at the Aerospace Corporation and the Air Force's Space and Missile Systems Organization (SAMSO), two employers collocated at El Segundo in the Los Angeles basin. The program is currently being expanded to include 17 company-leased vans, seating 10 to 12 passengers each and operating at breakeven fares over round-trip distances from 25 to 110 miles. Detailed guidelines are presented on organization, costs, data base requirements, and operating procedures. Some insight is also provided on factors and unique features which have made the program successful.

(authors)

Caltrans (California State Department of Transportation), The Sacramento Carpool Project: A Joint City, County, State, and Federal Effort, Second Quarterly Status Report, January 1975.

Abstract

This is the second quarterly report for the Sacramento Carpool Project, and it covers the months of October, November, and December 1974. Its purpose is to unify efforts to encourage carpooling in the Sacramento area and obtain benefits such as improved air quality, conserved fuel, lowered transportation costs, decreased parking needs, and improved service on existing streets and highways.

Under the project, Caltrans (the State Department of Transp/rtation) acts as a consultant to Sacramento County to promote carpooling using manual, dial-in, and computer matching systems. The City of Sacramento also acts as a consultant to the county by providing preferential carpool treatment in city-owned parking facilities.

(author)

Cambridge Systematics, Inc., and Allan M. Voorhees and Associates, Inc., Carpool Incentives - Part I: Evaluation of Operational Experience and Part II: Analysis of Transportation and Energy Impacts, (Prepared for the Federal Energy Administration), December 1975.

Abstract

The study evaluates the potential impact on travel behavior and energy consumption of a wide range of carpool incentives through the use of disaggregate demand models. In addition, the study includes a comprehensive review and evaluation of past, present or proposed uses of carpool incentives, implementation characteristics, results achieved, institutional problems encountered, and public acceptability. Explicit quantitative predictions of impacts are made for 19 individual and for various combinations of carpool policy incentives using behavioral models of household travel demand applied to 2 case study cities, Washington, D.C., and Birmingham, Alabama. The changes in public use of single occupant cars, carpools, and mass transit are estimated, and effects on work and non-work travel, automobile ownership, and energy consumption, are analyzed.

(Oram)

Federal Energy Administration, Cost Effectiveness Analysis of TVA Employee Transportation Incentive Program, (Prepared for the Office of Conservation), May 1977.

Abstract

This report describes the Tennessee Valley Authority (TVA) commuter pooling program. Included are carpool, vanpool, and commuter bus elements. The prime objective of the report is to quantify the benefits and costs of the program and identify the non-quantifiable implications of TVA's employee ride-share activities in Knoxville.

(PMM&Co.)

Federal Energy Administration, Office of Energy Conservation and Environment, Economic Feasibility of Independent Vanpool Operations, September 1976.

Abstract

The study provides summary data from several employer sponsored vanpool programs and promotes the introduction of independent vanpool operations (IVO). The main purpose of the study is to examine the economic and financial feasibility of IVOs in the United States. A breakeven analysis is presented as well as a computer simulation which indicate that with an average vehicle occupancy of 9 or more riders, vanpooling is profitable for van fleets of 30 or more. Given start-up costs, salaries, and wages, it is concluded that the most likely IVO operators are those already involved in the transportation business in some capacity.

(PMM&Co.)

Forstater, Ira, and Twomey, Ed, Vanpooling: A Summary and Description of Existing Vanpool Programs, EPA, Office of Transportation and Land Use Policy, Washington, D.C., January 1976.

Abstract

The purpose of this booklet is twofold: (1) to present in one source the current data on known vanpool programs; and (2) to allow prospective vanpoolers to analyze and compare the various approaches made to vanpooling by those programs already in operation. It is the key characteristic of vanpool programs that, despite the essential similarity among them, each is a unique adaptation to a particular situation. A knowledge of these possible variations should prove helpful to an employer planning to embark on a vanpool project.

Above all, it is hoped that this booklet will, to some extent, further the exchange of information among vanpooling companies, prospective vanpooling companies, and all levels of government that is so vital to the successful expansion of the commuter van concept. To that purpose, each summary description of a program contains a contact name and phone number so that interested persons can obtain more specific information. The best advocates and sellers of the vanpool concept are frequently the very persons who are actually running the program. In most cases, these people are more than willing to share their time and expertise with interested individuals or corporations.

The material contained herein is the result of extensive interviews and information gathering during October and November 1975. Included with the current status of existing vanpool programs are discussions of various approaches and considerations important to vanpool programs, vanpool cost and fare parameters, and a bibliography of vanpool resource materials. The fast expanding nature of vanpooling renders a project such as this partly outdated almost as soon as it is completed. However, this report can continue to serve prospective vanpoolers as a source of information on programs already underway--programs which will have already answered many of the questions a prospective vanpooler is likely to raise and which will have also solved many of the problems that a prospective vanpooler is likely to encounter.

(Oram)

Gray Advertising, Inc., Marketing Plan to Accelerate the Use of Vanpools, July 1976.

Abstract

This manual is the first step in translating the success of a few companies' vanpool programs into a prototype for national expansion. It attempts to present and analyze the dynamics of the vanpool market--i.e., the conditions which create demand (market)--for the product (vanpools), factors which stimulate and impede the growth of this market, supportive governmental actions/incentives desired by prospective vanpool companies, and forecasts of market conditions which would impact upon the viability of vanpools.

(authors)

Kendall, Donald, Work Trip Carpooling and Its Potential, (Prepared for the U.S. Department of Transportation, Transportation Systems Center).

Abstract

The purpose of this paper is to approach the questions of how much an increased level of carpooling will alleviate problems mentioned above, and what maximum extent of carpooling is likely, considering only those trips that are candidates for ride sharing.

The analyses reported here focus on travel to work in urban areas. The degree of auto commuting and regularity of schedules, combined with the low current work trip auto occupancy (lower than any other t2ip purpose), make commuter trips appear to have more potential for carpooling than most other trip types.

National statistics regarding the current extent of work trip carpooling are presented. A technique for estimating a practical maximum level of carpooling in an urban area is described, together with some preliminary results of its application to the Boston area. These results are translated into estimates of fuel savings and impacts on congestion, pollution, and parking conditions.

(author)

Miesse, C. C., Potential VMT Reductions from Carpools and Vanpools in Major Metropolitan Areas, (Prepared for the Environmental Protection Agency, Region III), 1976.

Abstract

Techniques are developed for determining the carpool/vanpool potential for major employment centers, as functions of employee residential distribution and income level. The techniques are based on a car occupancy model previously developed for the National Capital area, and an empirical vanpool model derived from the highly successful vanpool program by the 3M Corporation in St. Paul. Application of the techniques to private and government employment centers in the National Capital area indicates a potential 10 percent reduction in peak hour traffic and a potential saving of 3.5 percent of total daily gasoline consumption.

(authors)

Miller, Gerald K., and Green, Melinda A., An Analysis of Commuter Van Pools, The Urban Institute, Washington, D.C., February 1976.

Abstract

This report analyzes the planning, organization, and operation of commuter van programs (often called van pools) in the U.S. and Canada. More than 30 existing operations have been examined and classified by considering the major organizational arrangements for providing the service. The potential benefits van commuting generates for the users, employers, and community are discussed; and the paper presents guidelines on the demand environment and indicates the service characteristics that are likely to be important in attracting riders. Major legal issues, including public regulation, competition with bus transit, liability and insurance, and implications of driver compensation are also reviewed. The potential for widespread van programs and the proposals for large-scale, area-wide van service are also discussed. A second report, entitled "Guidelines for the Organization of Commuter Van Programs," presents detailed procedures on how to organize and administer an employer-based van program.

(authors)

Miller, Gerald K., and Green, Melinda A., Guidelines for the Organization of Commuter Van Programs, The Urban Institute, Washington, D.C., February 1976.

Abstract

This document describes the major stages in the development of a company sponsored commuter van program, including: the investigation of program feasibility, the promotion and organization of the service, and the operation and administration of an ongoing operation. These guidelines are based on the experience of several successful programs, and potential sponsors should find them useful for their particular situation. Seven detailed case studies which are representative of the major types of commuter van services are also presented in the appendix.

This is the second of two documents on commuter vans. The first report, entitled "An Analysis of Commuter Van Experience," examines the planning, organization, and operation of commuter van programs. Potential benefits, the demand environment, major legal issues, and potential for the development of widespread and large-scale area-wide van service are discussed in this report.

(authors)

Oregon Department of Transportation, Portland Metropolitan Area Carpool Project: Interim Report, December 1974.

Abstract

The Interim Report of the Portland Metropolitan Area Carpool Project describes the development and success of carpool promotional efforts undertaken in Portland during 1974. Elements that contributed to the success of the program include: extensive marketing activities, carpool matching services, employer support, and identification of park-and-ride facilities. Based on follow-up surveys the report estimates that more than 22,000 persons, or nearly 7 percent of area employees, were induced to carpool as a direct result of project activities. The report also describes the institutional and financial arrangements for area-wide carpool promotion in Portland.

(Oram)

Owens, Robert D., and Sever, Helen L., The 3M Commute-A-Van Program Status Report, 3M Co., St. Paul, Minnesota, May 1974.

Abstract

The 3M Commute-A-Van Program is a system whereby the 3M Company furnishes a standard 12-passenger van to an employee willing to take at least eight other employees to and from work. The employee driver is compensated with free rides, personal use of the van at a reasonable mileage rate and the excess fares for any passengers over the minimum of eight. The program began as a six-van pilot operation at 3M Center in April 1973. Since that time, the program has expanded to include, as of May 1974, a total of 57 vans. Further expansion of the program at 3M installations both in St. Paul, Minnesota, and elsewhere is anticipated. Many transportation, environmental, and energy benefits have been achieved as a direct result of 3M's Commute-A-Van Program. In addition, a substantial amount of ramp-type parking construction at 3M Center has been delayed. Many other van pooling programs have been started by other firms as a result of the 3M experience. It is felt that van pooling can certainly make a significant contribution towards solving many of our perplexing urban transportation problems.

(authors)

Pratsch, Lew, Carpool and Buspool Matching Guide, (4th Ed.), FHWA, Washington, D.C., January 1975.

Abstract

Continuing in the pattern established by the previous three editions, this guide examines and updates data on successful carpool, vanpool, and buspool programs. It provides a source of how-to information for the initiate pool planner and pays particular attention to DOT-FHWA matching programs.

(JHK and Associates)

Pratsch, Lew, Vanpool Discussion Paper, (Prepared for the Federal Energy Administration), April 1977.

Abstract

This brief paper discusses the history of vanpooling and several employee, third-party sponsored vanpool programs. The concept of individually owned and operated vanpool programs is introduced. Based on a market research effort conducted in Minneapolis, Minnesota, for Public Service Options, Inc., aggregate national estimates of vanpool potential in 1980, 1985, and 1990, are presented. The topics of potential fuel savings and pollution reduction are addressed.

(PMM&Co.)

Transportation Center, Tennessee University, Ride Sharing and the Knoxville Commuter, August 1975.

Abstract

The report gives a detailed analysis of the Knoxville commuter, identifies the current commuting methods and their relative importance to members of the Knoxville work force, studies the relative importance of sharing rides for work trips in the firms observed, and analyzes employee attitudes towards various aspects of shared rides. The report also outlines the current rate of travel within various corridors of the Knoxville community and offers a detailed summary of the benefits of ride-sharing in terms of congestion, fuel consumption, present and future highway capacity, and public acceptance of ride-sharing. The report examines the legal and institutional constraints which are currently inhibiting the development of various ride-sharing alternatives and offers recommendations for improving public transportation in Knoxville.

(Oram)

Transportation Research Board, Executive Summary Carpooling Seminar, August 1975.

Abstract

The seminar was held in Washington, D.C., on December 10 and 11, 1974. Seventy-five persons attended, representing a wide variety of interests in the specific topic of carpooling, and in the general topic of more efficient highway transportation.

The seminar was assembled to enable the exchange of knowledge, ideas, and experiences. To accomplish this, a five-session format was employed wherein discussion leaders, each selected for his respective expertise, conducted a session. To stimulate discussion, each leader first presented a brief and informal commentary, then brought the session into open-forum.

The goals of the seminar were two-fold: to answer specific questions relative to particular situations encountered by attendees; and to aggregate commonalities between systems with regard to approaches taken, methods evolved, successes and failures.

(author)

Transportation Systems Center, Carpooling: Status and Potential (Prepared for U.S. Department of Transportation), June 1975.

Abstract

This report contains the findings of studies conducted to analyze the status and potential of work-trip carpooling as a means of achieving more efficient use of the automobile. Current and estimated maximum potential levels of carpooling are presented together with analyses revealing characteristics of carpool trips, incentives, impacts of increased carpooling, and issues related to carpool matching services. National survey results indicate that the average auto occupancy for urban work-trip is 1.2 passengers per auto. This value, and average carpool occupancy of 2.5, have been relatively stable over the last five years. An increase in work-trip occupancy from 1.2 to 1.8 would require a 100 percent increase in the number of carpoolers. A model was developed to predict the maximum potential level of carpooling in an urban area. Results from applying the model to the Boston region were extrapolated to estimate a maximum nationwide potential between 47 and 71 percent of peak period auto commuters. Maximum benefits of increased carpooling include up to 10 percent savings in

auto fuel consumption. A technique was developed for estimating the number of participants required in a carpool matching service to achieve a chosen level of matching among respondents, providing insight into tradeoffs between employer and regional or centralized matching services. Issues recommended for future study include incentive policies and their impacts on other modes, and the evaluation of new and ongoing carpool matching services.

(Oram)

U.S. Department of Transportation, Carpool Incentives and Opportunities, Report of the Secretary of Transportation to the United States Congress, February 1975.

Abstract

Section 3(e) of the Emergency Highway Energy Conservation Act directed the Secretary of Transportation to conduct a full investigation of the effectiveness of carpool promotional methods employed in the carpool demonstration program, and other methods which might lead to significant increases in carpool ridership in urban areas throughout the country. This report was submitted to the U.S. Congress in response to that directive.

The report includes: (1) a description of methods and programs used to promote carpooling; (2) a discussion of the success of these methods; (3) an evaluation of a broad range of incentives to promote carpooling; and (4) recommendations on government actions to encourage carpooling.

The report recommended that the Federal Government broaden its efforts to encourage carpooling to set an example as a major employer. The report also recommends that state and local governments expand efforts to encourage carpooling through (1) the development of highway projects providing preferential treatment for carpools, and (2) assistance to employers in promoting carpooling among their employees.

(Oram)

U.S. Department of Transportation, How to Pool It, FHWA & HUFSAM, Washington, D.C., May 1975.

Abstract

Cast from the employers' viewpoint, this highly visual guide gives detailed guidance in the implementation and maintenance of pooling projects. Besides examining individual programs, it gives careful attention to the legal aspects and suggests competent advice be sought before completion of any new project.

(JHK and Associates)

V. TRANSIT FARE AND SERVICE STRATEGIES

Bates, John W., "Effect of Fare Reduction on Transit Ridership in the Atlanta Region: Summary of Transit Passenger Data," Transportation Research Record 499, 1973.

Abstract

The paper presents in summary form the findings from an intensive on-board survey conducted by the Metropolitan Atlanta Rapid Transit Authority during November 1972. On March 1, 1972, transit fares in Atlanta were reduced from 40 cents to 15 cents, with free transfers. Patronage immediately increased significantly and continued to increase as the Authority initiated implementation of service improvements as part of its short-range transit improvements program. The research was designed to answer specific questions generated after the ridership increase was observed, including the magnitude of the increase and the distribution of increase between new transit riders and additional tripmaking by previous riders, the magnitude of diversion from automobile users, and characteristics of new and old riders. This is one of a series of reports from the overall research effort, which includes the on-board study to determine rider characteristics as well as an in-home study to determine attitudes of nonriders and the reasons they do not use transit.

(authors)

Boyd, J. Hayden, and Nelson, Gary R., Demand for Urban Bus Transit: Two Studies of Fare and Service Elasticities, (Prepared for the Institute for Defense Analyses Program Analysis Division), October 1973.

Abstract

An industry rule of thumb states that a 10 percent increase in fare charged by an urban public transit company will cause about a 3 percent decline in ridership. This paper reports the results of two separate studies conducted at IDA. Both of these studies indicate that the fare elasticity of demand is approximately double the industry rule of thumb (i.e., a 10 percent increase in fare will cause about a 6 percent decline in ridership).

(authors)

Greenspan, H.P., "The Case for Prepaid Transit," *Transit Journal*, February 1975.

Abstract

Arguments for and against a transportation tax can be fashioned from comparisons with the different means of financing other municipal services such as schools, libraries, sidewalks, and streets. These are largely academic exercises because the magnitude and urgency of the transit problem are sufficient reason to set a new precedent. The case for prepaid transit cannot be judged exclusively on theoretical grounds. The success achieved by the first city to adopt it will invite emulation by others.

(author)

Greenspon Advertising Agency, *Renaissance of a Local Bus System: The Wilkes-Barre, Pennsylvania Experience*, Simson & Curtin, Philadelphia, September 1974.

Abstract

In the aftermath of Hurricane Agnes and severe flooding, Wilkes-Barre, Pennsylvania experimented successfully with free bus transit, created a new regional transportation agency (LCTA = Lucerne County Transportation Authority), and greatly improved the quality of transit service over pre-flood conditions. This colorful report fully summarizes the step-by-step progression of this successfully planned and executed program.

(JHK and Associates)

Huron River Group, *Transit Fare Prepayment: A Guide for Transit Operators*, February 1976.

Abstract

This report documents a study of transit fare prepayment techniques, which are considered a meaningful stimulus to increasing transit ridership. The history of fare prepayment techniques is reviewed, noting the development and use of different fare structures, and of various prepayment methods: tickets, tokens, punch cards, passes, permits, and automatic fare collection. Recent trends affecting prepayment (public operation of transit, para-transit, payroll deduction, and transit as an employee benefit concept) are also discussed. From a survey of U.S. transit operators, data is presented on plans currently in use and the effects of multaple ride prepayment and pass programs on ridership and revenue. Transit user attitudes toward fare prepayment were also surveyed. Conclusions and recommendations are offered. Appendices include detailing of sampling procedures and results.

(Oram)

Kemp, Michael A., Reduced Fare and Fare-Free Urban Transit Services - Some Case Studies, The Urban Institute, Washington, D.C., July 1974.

Abstract

This paper presents case studies of the effects of low-fare and fare-free policies adopted in several American and European cities. There is a general introduction to the concept of travel demand elasticities, and it is pointed out that because the elasticity with respect to fare is usually small, any reduction in fares will lead to loss of gross revenues and small ridership increases. Elasticity with respect to level of service offered is generally higher, and service improvements may have a relatively greater effect on patronage.

Four case studies are included: Boston, Free Fare; Rome, Italy; Atlanta Fare Reduction; and Stockholm Fare Structure Reorganization.

(author)

Kemp, Michael A., Transit Improvements in Atlanta - The Effects of Fare and Service Changes, The Urban Institute, Washington, D.C., December 1973.

Abstract

The bus system in Atlanta, Georgia was purchased in February 1972, by the Metropolitan Atlanta Rapid Transit Authority, a public agency. MARTA, assisted by the proceeds of a local one percent sales and use tax and a federal capital grant, immediately commenced the implementation of a "short-range transit improvement program." The base fare over most of the system was reduced from forty cents to fifteen cents, and significant service improvements were gradually introduced.

This paper examines the operating statistics for the first 12 months of the system's operation under public ownership in an attempt to investigate the impacts of the short-range improvement program on system ridership levels. Using aggregate data only, several longitudinal models of monthly passenger volumes have been estimated, all of which provide a statistically significant level of explanation of the month-to-month variations. It is concluded that, for the major fare cut of March 1972, the elasticity of ridership

with respect to base fare level was roughly -0.15 to -0.2. Over the first 12 months of operation at low fare, the fare reduction appears to have added roughly 8.2 million revenue passengers to the 42.8 million revenue journeys which would otherwise have been made at the forty cent base fare level, given the MARTA service improvements. This is an increase of just over 19 percent.

(author)

Kirby, Ronald F., and Bhatt, Kiran U., Guidelines on the Operation of Subscription Bus Services, The Urban Institute, Washington, D.C., August 1974.

Abstract

This report provides guidelines on the planning, organization, and operation of subscription bus services. The report deals with identifying potential riders; obtaining vehicles and drivers; meeting regulatory requirements; setting routes, schedules and fares; revising routes and schedules as demand changes; and obtaining special privileges such as the use of express lanes, priority movement at intersections, and close-in parking. The term "subscription" has been applied to a variety of specialized bus services tailored to serve urban travelers who patronize them on a regular basis, usually for their daily trips to and from work. This report concentrates on services provided by large buses. Guidelines are presented which are critical to the successful operation of subscription bus services. These guidelines are based on detailed case studies of subscription services in 10 cities. The report concludes with a discussion of the potential impacts of subscription services on the congestion, pollution, and fuel consumption associated with urban travel. A glossary and bibliography are furnished.

(Oram)

Leicester, Edward Hall, et al., Transit Technical Studies: Analysis of Alternative Bus Fare Structures.

Abstract

The report reviews fare collect)on options. The study was intended to inform WMATA on the various techniques for collecting transit fare within the Washington Metropolitan area. The report compares various methods and presents pros and cons of each. The report includes a glossary of terms.

(PMM&Co.)

Massachusetts Bay Transportation Authority, and Decision Research Associates, Inc., Evaluation of a Prepaid Payroll Deduction Transit Pass, 1976.

Abstract

This report documents an evaluative study of the Massachusetts Bay Transportation Authority (MBTA) Prepaid Transit Pass Program. The marketing program is designed to promote the increased use of transit by allowing employees to buy annual travel passes through conventional payroll deduction. This document evaluates the concept and presents implementation procedures for use by other transit systems.

(Oram)

Padron, Manuel, and Stranger, Richard, "No-Barrier Fare Collection," Transportation Research Record 614.

Abstract

This paper reviews a study performed by the Metropolitan Atlanta Rapid Transit Authority on the feasibility of a no-barrier fare-collection system and discusses the potential of this self-service concept in the United States. No-barrier fare collection (often referred to as self-service or automatic) is widely used in Western and Eastern Europe to handle fare-collection requirements. It is not used anywhere in North America, and good information on European experience with it is sparse at best. The assumption that cheating would be rampant in the United States if this concept were employed has unrealistically dominated discussions of it and overwhelmed any rational analysis of its benefits. This study found no large propensity to defraud; it estimated that 3 to 5 percent of daily passengers could be expected to evade fares. This figure is larger than that found in European cities, but can nevertheless easily be handled. The no-barrier fare-collection concept thus appears to have a good potential in the United States, particularly for certain applications. One of these is for integrated bus-rail systems using zone fare structures and another is for light rail systems.

(authors)

Reish, Robert, and Surti, Vasant H., A Feasibility Study of Free Bus Service for a Street Corridor in Denver, Center for Urban Transportation Studies, Denver, 1972.

Abstract

An area of Denver was selected. The area contained most of the three bus routes that run in an east-west direction from suburban eastern Denver to downtown. A survey was conducted among automobile users in the area testing their selected mode of travel if free bus service were offered. Estimates of increased bus ridership were developed by expanding the survey results. Transportation costs were analyzed for the two situations: the total operating and travel time cost in the present state, and the operating and travel time cost if free bus service was employed. It was found that total transportation expense was less under a free bus system than under a present fare system, but the margin of advantage was small.

(authors)

Scheiner, James I., "The Patronage Effects of Free Fare Transit," Traffic Quarterly, Volume XXIX, Number 1, January 1975.

Abstract

Data from the free transit demonstration in the Wilkes-Barre, Pennsylvania area suggest that the offering of free transit will immediately attract significant numbers of additional patrons, with the percentage patronage increase dependent on the current average fare of the particular transit system. Based on the analysis reported in this article, patronage increases due to free fare, with service and other factors remaining constant, range from 13 percent for a system with 10 cents average fare per boarding passenger to 86 percent for a system with 50 cents average fare. A typical transit system, with an average fare in the 30- to 35-cent range, could expect ridership to immediately increase 50 percent with the institution of free fare.

(author)

Silberman, Joan B., Editor, Mode Change Facilities, TRB, TRR 557, Washington, D.C., 1975.

Abstract

The Record includes four reports prepared for the 54th Annual Meeting of the Transportation Research Board and includes data on park and ride facilities and bus stops.

(JHK and Associates)

Stokey, Stan, Tennessee Valley Authority, A Citizen-Sponsored Bus System: The Knoxville, Tennessee Experience, December 1974.

Abstract

This paper traces the chronology of a citizen-sponsored express bus program. In less than one year a citizen-sponsored express bus has ballooned to a fleet of 12 express buses. The paper also discusses the impact of the express bus program on the local transit corporation and the community.

(Oram)

Urban Transportation Study Group, University of Missouri, Downtown Circulator Service in Kansas City: An Evaluation of Dime-A-Time, February 1974.

Abstract

Since a number of cities have or are considering adopting some kind of downtown circulator service, it is useful to describe and analyze a specific bus circulator service such as Dime-A-Time in Kansas City, Missouri. This study describes Dime-A-Time and its history and then goes on to analyze Dime-A-Time by comparing its operations and characteristics with similar service in Cleveland and Denver. It is shown that by eliminating rush hour service (as in Denver), Dime-A-Time could cut its operating deficit, although at the price of providing less service. A multiple regression model is used to test several hypotheses and estimate the value of the relationships among ridership, fare policy, and external conditions. The estimates obtained from this regression model make it possible to evaluate the impact of fare changes. It is shown that a somewhat higher fare would increase total revenue but not substantially.

Conclusions are offered on Dime-A-Time operations. Other cities may wish to adopt alternative systems such as the shorter hours used in Denver or the provision of circulator service with regular route buses. Benefits and costs of various alternatives are discussed.

(Oram)

VI. ENERGY, AIR QUALITY, EMISSIONS, AND ECONOMIC IMPACT

Alan M. Voorhees & Associates, Inc., A Guide for Reducing Air Pollution Caused by Transportation, (Prepared for the Office of Air Programs, Environmental Protection Agency), September 1971.

Abstract

This Guide is designed to aid transportation professionals and state air pollution agencies in selecting transportation controls that are suggested in the regulations promulgated pursuant to the Clean Air Act of 1970 (Federal Register, August 14, 1971). Actions considered here have been limited to traffic controls and traffic volume reduction techniques which can be implemented within the next three to five years and begin to make an immediate impact on air quality. Discussion of specific legal, institutional, and administrative problems of implementation is beyond the scope of this Guide.

The Guide has two major thrusts. First, it outlines general legislation that requires assessment of the air pollution impact of transportation; and second, it describes traffic strategies in terms of their impact on air pollution. In addition, an appendix provides basic air pollution information so that the reader may broaden his understanding of the problem.

(authors)

Alan M. Voorhees & Associates, Guidelines to Reduce Energy Consumption Through Transportation Actions, (Prepared for EPA), May 1974.

Abstract

This document is intended to serve as an aid to local transportation planners, traffic engineers, and administrators in the incorporation of energy conservation considerations into the transportation planning process, especially in reference to short-range transportation planning. Various types of low cost, short-term transportation actions are summarized, and their potential for reducing energy consumption is estimated. Summary tables are presented which array the actions in terms of relevant institutional and legal considerations as well as socioeconomic and environmental effects. Interrelationships between the energy consumption reduction potential of groups of actions are discussed, and a process for formulation of coherent packages of such actions is presented. Guidelines are presented for evaluating and formulating these action packages for large (1,000,000 and over population), medium (250,000 to 1,000,000), and small (50,000 to 250,000) urban areas. General conclusions are drawn. Transportation actions may reduce energy consumption in one or more of the following ways: improving efficiency of vehicle operation; causing a shift of trips from one or two passenger autos to higher occupancy buses, vans, and carpools; and reducing travel demand by, for example, instituting the four-day work week. Appendices are "Actions to Reduce Energy Consumption," "How Transportation Actions Can Reduce Energy Consumption," and a bibliography.

(Oram)

Busching, Herbert W., Editor, et al., Energy: Conservation in Transportation & Construction; Conference Report, Atlanta, Georgia, December 2-5, 1975, DOT, Washington, D.C., May 1976.

Abstract

These papers are the first complete update of energy conservation and consumption by the transportation industry since the recent oil shortages. They reflect the increasing concern felt for all aspects of transportation and construction. Special interest is drawn toward the suitability of urban transportation conservation and the revival of locomotive rail technology.

(JHK and Associates)

Claggett, Mike, A Comparative Analysis of EPA HIWAY, California and CALINE2 Line Source Dispersion Models, (Presented to the Transportation Research Board, National Academy of Sciences), January 1977.

Abstract

This paper provides a comparison of three different idealized line source dispersion models that predict carbon monoxide concentrations near highways. The comparison is accomplished by performing a sensitivity analysis and model validation. A sensitivity analysis refers to an analysis of the dependence of normalized concentration on variations of several independent input parameters (e.g., stability class, wind angle with respect to the highway, receptor distance from the highway, etc.). Model validation is accomplished by comparing carbon monoxide concentrations measured near a highway with concentrations predicted by the models. The models under study are: (1) EPA HIWAY, (2) the original California Line Source, and (3) CALINE2. All these models are based on the Gaussian dispersion equations.

(author)

Engineering Science, Inc., Air Quality Assessment Location and Preliminary Design Study - New Location Route I-95, October 1975.

Abstract

This study considers the impact on air quality of alternative routes for a new Interstate highway between Petersburg and Richmond, Virginia. In addition, the no-build condition has also been evaluated. The northern terminus of the proposed new highway is at State Highway 5, near Varina in Henrico County. In the south, it will connect with existing interstate highways south of Petersburg. In all cases, including the no-build alternative the section between the northern terminus and the Richmond-Petersburg Turnpike will be constructed as a link in the Richmond circumferential highway.

The primary objective of the study is to establish whether or not any of the proposed alternative routes have the potential for causing a violation of standards and whether or not any of the proposed routes will interfere with the Virginia plan for attainment and maintenance of the standards. A second objective is to provide information which, with other environmental, societal, and engineering information, will permit selection of the best of the several alternative routes. Further, this report will contribute to the air quality technical data for the environmental impact statement required by the National Environmental Policy Act.

(author)

Hittman Associates, Transportation Energy Research Study for the State of Maryland, (Prepared for the Maryland Department of Transportation, Division of Transportation Planning and Development), August 1977.

Abstract

The purpose of this short nine-week study is to provide the Maryland Department of Transportation with two items concerning highway transportation energy use in the state:

- information on the effects of selected strategies on highway transportation energy use; and
- an assessment and choice of methodologies to determine energy used in both construction and utilization of highway facilities and case study application of chosen methodologies.

These items are the basis of two tasks in this study, Tasks 1.0 and 2.0, respectively. Part 1 contains the information for Task 1.0, and Part 2 contains the information for Task 2.0.

(authors)

Institute of Public Administration, and Technekron, Inc., Evaluating Transportation Controls to Reduce Motor Vehicle Emissions in Major Metropolitan Areas, (Prepared for the Environmental Protection Agency), November 1972.

Abstract

The purpose of this Interim Report is to bring together in a preliminary form a description and evaluation of those transportation controls which could conceivably reduce motor vehicle emissions in the next few years. The research undertaken included a review of the relevant transportation literature, as well as of more recent works which specifically address the use of transportation controls to reduce motor vehicle emissions (see bibliography attached to the report). The report also attempts to summarize new pertinent evidence (e.g., recent research on traffic flow improvements on a network-wide basis, demonstrations to date of public transport improvements, accumulated experience with vehicle-free zones), much of which has not previously appeared in print.

(authors)

INTERPLAN Corporation, Joint Strategies for Urban Transportation, Air Quality and Energy Conservation, January 1975.

Abstract

Problems of urban mobility, air quality, and transportation-related energy consumption constitute major issues of national concern. This report represents the joint efforts of UMTA, EPA, and FEA to develop an integrated approach for resolving problems created by traffic congestion, air pollution, and petroleum shortages. The purposes of this report were to: (1) identify all principal strategies and actions which impact on each of the agencies' transportation-related goals; (2) systematically elucidate the interrelationships among them; and (3) devise a way of isolating those groups of strategies and actions whose total impacts would be synergistically enhanced if implemented jointly. The report represents the culmination of the study effort to attain these objectives. In Part I, the basic relationships among the strategies and actions are summarized in a matrix display. Each item is ranked to assess its impact on six subgoals, or phenomena, in the near or long term: improved auto alternatives, improved vehicular flow, reduced auto use, reduced travel demand, reduced vehicular emissions, and reduced vehicular petroleum consumption. Two synergistic joint action programs are presented. Part II contains an information review of experience, impacts on goals (mobility, air quality, energy conservation), and an overall evaluation of 54 specific actions, based on a review of 376 sources listed in the appendix.

(Oram)

Metropolitan Washington Council of Governments, Essential Air Quality and Energy Data to Analyze the Local and Regional Impacts of the WMATA Rapid Rail System, June 1975.

Abstract

This report utilizes existing Washington metropolitan land use, transportation, energy, and air quality data, methodologies, and models to estimate particular impacts of the development of a 98-mile METRO system. The METRO Draft Environmental Impact Statement originally investigated the energy and air quality impacts of the regional rapid rail system. Comments on the draft EIS indicated more detailed information was required in these areas.

This study is integrally related to the station-by-station EISs which are studying the micro-level or immediate vicinity impacts of the development of METRO. The regional study investigates the overall impact of the system in reducing dependency on the automobile. The station impact studies will ensure that over-concentration of METRO, METRO parking, and METRO-induced growth will not cause localized violations of air quality, while the regional system attempts to solve regional air quality problems.

This report is divided into three major sections which contain data and results on the transportation, air quality, and energy impact analysis. A summary of the data study is provided at the beginning of the report.

(author)

Muzyka, Ann, Fantasia, John F., and Goodman, Joseph M., "Bus Operations and Energy Conservation," Traffic Engineering, November 1975.

Abstract

This article examines the bus stop-and-go driving pattern in a central business district with an effort to reduce the number of stops by a judicious use of re-timed signals. The resultant energy savings are noted.

(JHK and Associates)

Peat, Marwick, Mitchell & Co., A Marketing Approach to Carpool Demand Analysis, Summary Report, (Prepared for the Federal Energy Administration), April 1976.

Abstract

This report documents the methodology and major findings of a study conducted for the Federal Energy Administration. The study objective was to estimate the travel and associated energy consumption impacts of policies designed to encourage increased carpooling in urban areas. The study focused on work trip travel as being that portion of travel most easily affected by carpooling programs.

A quantitative marketing methodology was adapted and applied in place of traditional modal split models to permit more effective treatment of the significant non-cost and non-time factors associated with the decision to carpool. A trade-off analysis model was applied to paired comparison preference responses of commuters obtained from surveys conducted in Chicago, Pittsburgh, and Sacramento. Estimates of modal split, VMT, and fuel consumption impacts were made for a number of carpool incentive and disincentive policies.

(PMM&Co.)

Peat, Marwick, Mitchell & Co., Socioeconomic Impacts of Alternative Transportation Control Plans for the San Diego Air Quality Control Region, (Prepared for EPA), November 1974.

Abstract

Primary objectives of this study were to assess the economic and social impacts which might result from implementing the EPA promulgated plan and to assess the impact of selected alternative transportation control plans.

This study was similar to a pilot study in the sense that it developed methodologies for evaluating costs and transportation impacts, estimating measures, and assessing allocation techniques and socioeconomic evaluation data. The project team feels that these data will be useful to EPA and other urban areas as a basis for the development of policy analysis and management tools.

(author)

R. H. Pratt and Associates, Transportation Controls for Air Quality Improvement in the National Capital Region, (Prepared for the Study Management Working Group National Capital Region Transportation Air Quality Study), October 1976.

Abstract

The purpose of this study was to analyze in detail the transportation and air quality implications of existing and alternative elements of the Transportation Control Plan in the National Capital Interstate Air Quality Control Region. This study was prompted by questions which had been raised regarding the implementation of certain of the transportation control measures included in the plan promulgated by the Environmental Protection Agency in December 1973, and by the desire to perform a detailed technical analysis of the impacts of these and other proposed control measures.

The study included the following elements:

- an historical review and description of the existing Transportation Control Plan;
- a detailing of the implementation status of the existing Transportation Control Plan;
- a review of the existing air quality and transportation data base used in the analysis of transportation control strategies;
- an evaluation of analytical procedures used in the development of the existing Transportation Control Plan;
- the development of a set of criteria by which to evaluate the effectiveness, appropriateness, and impact of transportation control measures and packages of measures;

- a compilation and preliminary screening of a list of candidate transportation control measures, including those measures in the present Transportation Control Plan;
- an analysis of 62 candidate transportation control measures using travel demand and air quality modeling procedures and a qualitative evaluation of each measure's cost, feasibility, and effect on other measures;
- an analysis of the transportation and air quality impacts of four packages of transportation control measures and an evaluation of the packages' cost, impact on regional travel accessibility, and effect on energy consumption; and
- the development of a VMT control measure effectiveness monitoring program.

(authors)

Stearns, M. D., The Behavioral Impacts of the Energy Shortage; Shifts in Trip-Making Characteristics, December 1975.

Abstract

In an attempt to detail intra-societal responses to the 1973-1974 energy shortage, this study contrasts aggregate and disaggregate shifts in trip-making characteristics, including frequency, mode, and purpose. National sample survey home interview data, obtained from 700 respondents during November-December 1973 and February 1974--the energy shortage onset and peak, respectively--were analyzed to locate statistically significant shifts.

Analysis reveals a decreased aggregate trip frequency, unchanged modal usage, and decreased shopping trips. When disaggregated by economic level, higher income level respondents decreased trip frequency and shopping trip incidents. By contrast, lower income respondents report unchanged trip frequencies and decreased auto-driving. All categories of respondents report unchanged work trip modes.

This study suggests that behavioral adaptations to the energy shortage vary by income level and that policy formulation must be sensitive to intra-societal responses. Policy implications suggest that travel demand is shaped by income level and that it combines essential and discretionary components.

(author)

Technology Sharing Program Office, Energy Primer: Selected Transportation Topics, Transportation Systems Center, DOT, Cambridge, Massachusetts, 1976.

Abstract

This Energy Primer has been designed to provide broad overviews of the current and projected transportation energy situation in the country; energy statistics, supply and utilization forecasts, and evaluations of conservation alternatives are the topics emphasized. A survey was made of works in the field--articles, government reports, Congressional testimony, and conference papers--and 10 were chosen for inclusion. The abstracts contained in this publication have been prepared from carefully selected recent literature. The concern has been to include as much of the author's data as possible, in order to save time by allowing the reader to consult the Primer rather than scattered original reports. Author's tables were found to be both highly informative and concise and therefore appear often.

(authors)

Transportation Assessments Group, Office of Technology Assessment, Energy, the Economy, and Mass Transit, U.S. Congress, Washington, D.C., December 1975.

Abstract

As a response to increasingly serious energy conditions, this report for Congress examines how these shortages affect both transit and the economy. The report summarizes a number of findings regarding recent trends in transit, the effects of recent economic conditions on transit, and the relative merits of utilizing alternative transit systems to increase use in order to achieve energy conservation objectives.

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(JHK and Associates)